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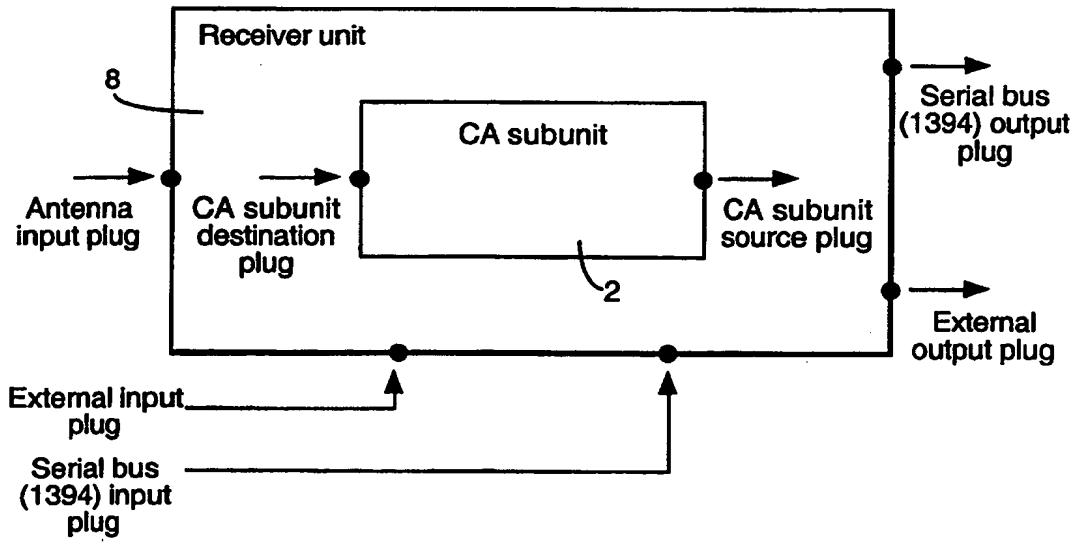

(57) Abstract

A networked Conditional Access Module provided on an IEEE 1394 network, by defining a Conditional Access Module as a Conditional Access Subunit of the IEEE 1394 network, providing AV/C Conditional Access Commands to allow communication between the Conditional Access Subunit and other Subunits on the network, the Conditional Access Subunit including means to receive AV/C Conditional Access Commands over the IEEE 1394 network from another subunit, and means to transmit AV/C responses over the IEEE 1394 network in response to the received AV/C Conditional Access Commands.

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NETWORKED CONDITIONAL ACCESS MODULE

The present invention relates to a networked conditional access module and methods of implementing such a module on a network. More particularly, it relates to the provision of a Conditional Access Subunit for an IEEE 1394 network.

With the development of digital multi-media and in particular digital television, it has been proposed to provide a conditional access module. In the field of digital video processing, it is known to code digital video signals such that special processing is needed in the receiver to be able to reproduce the video signals. In particular, it has been proposed to provide a conditional access module which can perform all of the descrambling and other conditional access functions of the digital TV receiver. This allows conditional access and signal decoding functions to be separated from a host receiver, such that a generic digital TV receiver can operate with many different conditional access systems in different conditional access modules.

To allow communication between a conditional access module and a digital TV receiver, a common interface has been proposed and standardized by CENELEC (EN50221 Common Interface Specification for Conditional Access and other Digital Video Broadcasting Decoder Applications). This standard Common Interface defines a transport stream interface in which various virtual channels are time multiplexed and a command interface over which various additional command data are sent. The common interface thus allows connection of a conditional access module to a digital TV receiver or indeed any other digital video device.

As a basis for the present invention, it is now recognised that it would be advantageous to provide a conditional access module on a local network of digital multi-media devices including audio and video devices, such that the various functions available in the conditional access module could be provided to all of the devices on the network.

A standard has been proposed for connecting together various digital video devices on a local network. In particular, IEEE 1394 - 1995 is an IEEE standard for a high performance serial bus. It defines a bus, which will be referred to as an IEEE 1394 serial bus, for connecting together various digital consumer audio/visual products.

The IEEE 1394 specification defines a physical link connector, electrical signalling and a set of link and transaction protocols allowing the serial bus to self configure and carry audio, video and control information efficiently. A further set of additional protocols have also been defined to carry MPEG data and provide control mechanisms between different items of equipment on the IEEE 1394 serial bus. These protocols are defined in the specification "Digital Interface for Consumer Electronic Audio/Video Equipment" (IEC61883).

The IEC61883 specification enables several command protocols to be used. One set of commands are known as audio/video control - command transactions (AV/C-CTS) and are specified in the AV/C Digital Interface Command Set Document development by the IEEE 1394 Trade Association (see AV/C Digital Interface Command Set Version 2.0D March 26, 1997 Audio/Video Working Group of the 1394 Trade Association). The AV/C CTS defines a command set for consumer and professional audio/visual equipment. The AV/C CTS commands are carried within the FCP (Function Control Protocol) packet format defined by IEC61883.

An object of the present invention is to provide means by which a conditional access module may be provided on an IEEE 1394 network.

According to the present invention, there is provided a method of providing a Conditional Acess Module on an IEEE 1394 network, the method comprising:

defining a Conditional Access Module as a Conditional Access Subunit of the IEEE 1394 network;

providing AV/C Conditional Access Commands to allow communication between the Conditional Access Subunit and other Subunits on the network.

According to the present invention, there is provided a conditional access subunit for connection to an IEEE 1394 network, the subunit including:

means to receive AV/C Conditional Access Commands over the IEEE 1394 network from another subunit; and

means to transmit AV/C responses over the IEEE 1394 network in response to the received AV/C Conditional Access Commands.

According to the present invention, there is provided a subunit for use with a conditional access subunit on an IEEE 1394 network, the subunit including:

means to transmit AV/C Conditional Access Commands over the IEEE 1394 network to the conditional access subunit; and

means to receive AV/C responses from the conditional access subunit over the IEEE 1394 network in response to the transmitted AV/C Conditional Access Commands.

In this way, by treating the conditional access module as a subunit of the IEEE 1394 network and by providing conditional access commands as part of the AV/C command set, a conditional access module can be fully integrated on the network.

Preferably, the conditional access command includes a CA enable command and/or a CA entitlement command. The AV/C conditional access commands may also include a security command.

In this way, the CA enable command can be used to instruct the CA subunit as to which service is should descramble.

The enable command may include control commands as well as status and notify commands.

The CA entitlement commands may be used to interrogate the conditional access subunit to determine what entitlement the user has to services. It may be a status or notify type command.

According to the present invention, there is also provided a conditional access subunit for connection to an IEEE 1394 network for use in descrambling a transport stream received over the network wherein the conditional access subunit, having descrambled the transport stream, introduces a local scrambling before retransmitting the transport stream to other subunits on the network, such that only authorised subunits on the network capable of local descrambling can receive the information in the transport stream.

In this way, once a conditional access subunit has descrambled a program, the program does not become available for unauthorised copying. It can be transported only to an authorised subunit on the network, for instance a television display. This system can also be used to ensure that a particular conditional access subunit can only be used in conjunction with other particular types of subunit with the same local descrambling capabilities.

According to the present invention there is also provided a conditional access subunit for connection to an IEEE 1394 network having a tuner subunit, the conditional access subunit having means for periodically contacting the tuner subunit to request the received transport stream for a period of time sufficient to allow the conditional access subunit to update the entitlement management messages stored in the conditional access subunit.

In this way, even if a user does not operate the conditional access until for some time, such that entitlement information would have otherwise been missed, the

conditional access subunit automatically requests transport stream information periodically so as to obtain that entitlement information.

The present invention will be more clearly understood from the following description, given by way of example only, with reference to the accompanying drawings, in which:

Figure 1 illustrates a CA subunit;

Figure 2 illustrates CA subunit logic connections;

Figure 3 illustrates a CA subunit identifier descriptor;

Figure 4 illustrates a system specification for use with the descriptor of Figure 3;

Figure 5(a) illustrates a CA status descriptor;

Figure 5(b) illustrates a CA subunit status area info block;

Figure 5(c) illustrates a source plug status area info block;

Figure 5(d) illustrates a plug status info block;

Figure 6 illustrates CA subunit commands;

Figure 7(a) illustrates a CA enable control command;

Figure 7(b) illustrates the broadcast system specific data of Figure 7(a);

Figure 7(c) illustrates an elementary PID definition of Figure 7(b);

Figure 8(a) illustrates a CA enable response;

Figure 8(b) illustrates the broadcast system specific data of Figure 8(a);

Figure 9 illustrates status or notify command structure;

Figure 10 illustrates status or notify response structure;

Figure 11(a) illustrates a CA entitlement command;

Figure 11(b) illustrates the broadcast system specific data of Figure 11(a);

Figure 12(a) illustrates a CA entitlement response;

Figure 12(b) illustrates the broadcast system specific data of Figure 12(a);

Figure 13 illustrates a security control command;

Figure 14 illustrates command exchange between controller and CA subunit; and

Figure 15 illustrates a satellite IRD connected to a network conditional access module.

A requirement exists for a Conditional Access (CA) system that allows the manufacturer of a Digital Television Receiver (DTV) to access scrambled services from several broadcasters. This is achieved by defining a protocol that allows the CA system to reside on a module which can then be connected to the DTV allowing that DTV to access the service. A solution exists in the form of a PC Card connected

to a single receiver. However there exists a new requirement for a Networked Conditional Access Module (NCAM). The main requirements for this device are:-

- flexible form factor
- flexible access, for example peer to peer communication
- flexible location

This application proposes the format of the additional AV/C subunits that are required to implement the NCAM. The AV/C model for the NCAM will provide a conditional access system that is tailored for use on an IEEE 1394-1995 based digital network.

The purpose of the Networked Conditional Access Module (NCAM) is to provide conditional access functionality. The NCAM uses a logical collection of resources that allow the descrambling of selected services to take place. The required resources for the NCAM can exist either in one location, for example inside a DTV, or be distributed throughout the In Home Digital Network (IHDN).

The NCAM relies on both existing and additional subunits. The existing subunits that the NCAM makes use of are:-

- Tuner subunit
- Panel subunit

In order to implement a networked conditional access module on an IEEE 1394 network, an AV/C subunit is defined for the conditional access module. In particular, a conditional access subunit models the core functionality of a descrambler. The CA subunit receives scrambled streams, descrambles them and then outputs a descrambled stream. The CA subunit may communicate with other required subunits via asynchronous commands across the IEEE 1394 network.

The Tuner subunit is used as the data source, the Panel subunit is used to provide information to the user and receive input from the user. The CA subunit contains the descrambling functionality and can make use of smart card and modem subunits.

The resources that are required for an NCAM to function may be implemented privately within a single module. If a manufacturer wishes to develop an NCAM with the smart card and modem functionality integrated for the exclusive use of the NCAM this is allowed. In such a case the NCAM would only implement the CA subunit and make use of the tuner and panel subunits in other devices. It is likely for security reasons that an NCAM would be implemented with a private smart card. The smart card subunit is included for when a smart card could be used for other applications, for example a data card or "electronic cash" card.

The NCAM can also be implemented with distributed resources. In this case the CA subunit would work in conjunction with subunits embedded in other objects distributed throughout the digital network.

Depending on the service to be descrambled, all or some of the resources will be required. In a simple system that relies on a Smart Card to be inserted to authenticate the service the modem is not required, a simple form of display device is required to prompt the user to insert the card but interaction is not necessary. A more complicated system, for example a pay per view (PPV) system, requires all of the resources to allow a choice of services to be presented to the user and to allow the user make a selection. Therefore the NCAM may operate with reduced functionality if not all the required subunits are present.

Figure 1 illustrates the basic CA subunit 2. This can be a stand alone device or integrated into another device.

The CA subunit destination plug 4 is the input to the subunit 2. The signal format is compliant with the system(s) supported by the CA mechanism. The CA subunit destination plug 4 can connect either directly to the serial bus (1394) input plug or to the source plug of another suitable subunit; for example the input to the CA subunit could be a tuner subunit.

The CA subunit source plug 6 is the output of the subunit 2. The signal format is compliant with the system(s) supported by the CA mechanism. The CA subunit source plug 6 can connect either directly to the serial bus output plug or to the destination plug of another suitable subunit.

A CA subunit that implements a single source and destination plug is potentially capable of descrambling one or more services within an isochronous channel from a single source, providing the CA system is compatible with the source material.

Depending on the hardware capability of the CA subunit it is possible to implement multiple destination and source plugs. There are an equal number of source and destination plugs. Such a configuration allows a single CA subunit to provide descrambling of several independent streams/services at the same time. This model allows a very flexible, distributed AV network environment.

Thus, in other words, the CA subunit can receive different streams from one or more other subunits on the network, descramble them and re-route them to one or more other subunits as required. Any limitation is due principally only to bandwidth.

When making connections between the CA subunit destination plug and either the serial bus input or another subunit the connection is established manually using a CONNECT command. This connection is made before issuing a CA command. If the CA subunit is operating in a stand-alone mode then the destination

and source plugs of the subunit can be permanently connected to the input and output serial bus plugs.

If the CA subunit has an existing connection which has been locked and an additional connection is requested then a response of REJECTED is returned. If the connection is permanent then the conflicting command generates a response of NOT IMPLEMENTED.

The CONNECT command is used to connect the CA subunit source plugs to either another subunit or the serial bus output plugs.

All current connections of CA subunits are reported by the CONNECT status or CONNECTIONS status commands. This includes all permanent connections. A controller can determine if a connection is permanent by examining the "perm" flag of the responses for the CONNECT status and CONNECTIONS status commands.

The connection of the CA subunit to other subunits is implementation specific. Whether it is logical to allow the connection of the CA subunit to certain other subunits is considered at implementation time.

A CA subunit may be embodied inside a receiver, which is a device defined as one that contains a tuner subunit, or as a stand-alone device. Figure 2 illustrates how a CA subunit appears in a receiver 8; in a stand-alone device, there would likely be no antenna input plug (only 1394 serial bus and possibly "external" input plugs).

The following table illustrates the various combinations of connections between a receiver unit and a CA subunit plugs and which ones are valid or not. All invalid connections generate a response of NOT IMPLEMENTED.

Non CA Subunit Plug	CA Subunit Plug	Connection Valid ?	Comments
External antenna input plug	CA destination plug	NO	X
External antenna input plug	CA source plug	NO	X
External input plug	CA destination plug	NO	X
External input plug	CA source plug	NO	X
External output plug	CA destination plug	NO	X
External output plug	CA source plug	NO	X
Serial bus input plug	CA destination plug	YES	This connection must be created using a CONNECT command, or it may be a permanent connection
Serial bus input plug	CA source plug	NO	X
Serial bus output plugs	CA destination plug	NO	X
Serial bus output plugs	CA source plug	YES	This connection must be created using a CONNECT command, or it may be a permanent connection
Subunit source plug	CA destination plug	YES	This connection must be created using a CONNECT command, or it may be a permanent connection
Subunit source plug	CA source plug	NO	X
Subunit destination plug	CA destination plug	NO	X
Subunit destination plug	CA source plug	YES	This connection must be created using a CONNECT command, or it may be a permanent connection

When issuing the CONNECT Command the lock bit is used to ensure that connections are not broken by third parties.

The CA subunit can handle both full and partial transport streams. It is beneficial for the source to create a partial transport stream containing the elements of the service it wishes descrambled in order to save bandwidth on the bus. In the case where a partial transport stream is created and the EMMs (Entitlement Management Messages) are embedded in the transport stream, the source includes the EMMs in the partial transport

stream. It will not be possible for the CA subunit to descramble the desired services if the data contained in the EMMs is not present.

The CA system is used to prevent unauthorised access to broadcast material. Once the material has been descrambled, it can be protected when carried over the IHDN (In Home Digital Network). In particular, the CA subunit can implement a suitable Copy Protection system on both its destination and source plugs.

The CA subunit is provided with a subunit identifier. For each particular CA subunit, the subunit identifier describes the characteristics of the broadcast system(s) and CA system(s) supported by that CA subunit. More than one broadcasting system and CA system may be supported by a particular CA subunit. With the use of this information, other subunits on the network, particularly, the controller, will know how each CA subunit may be used.

Figure 3 illustrates the subunit dependent information which is contained within the subunit identifier descriptor.

The *CA_subunit_dependent_info_fields_length* field specifies the number of bytes for the non-info block fields of the subunit dependent information; in this case, through the system_specification[n-1].

A controller on the network preferably finds any number of information blocks following this field, such that the CA subunit dependent information can be extended in the future. Controllers can easily determine if any info blocks exist here by comparing the *CA_subunit_dependent_length* and *CA_subunit_dependent_info_fields_length* fields. If the following formula is true:

CA_subunit_dependent_length > (CA_subunit_dependent_info_fields_length + 2) then info blocks exist in this structure.

The CA_subunit_version field indicates the version number of CA subunit command specification that the CA subunit conforms to. The upper 4 bits show the major version number and the lower 4 bits the minor version number.

CA_subunit_version	meaning
10_{16}	Version 1.0 of the CA subunit specification
all others	Reserved for future specification

The *number_of_systems* field specifies how many broadcast systems are supported by this CA subunit.

The *system_specification* field describes each broadcast system and is illustrated in Figure 4.

The *specification_length* field indicates the size, in bytes of the entire *system_specification* structure.

The *system_id* field indicates a broadcast system that the CA subunit supports. The following broadcast systems are currently defined:

system_id	name
20_{16}	DVB
other values	reserved

The *implementation_profile_id* field specifies the profile ID of the CA subunit for this *system_id*. A CA subunit may be implemented with a different profile for each of the broadcast systems that it supports. There is one profile for each supported system.

The following profiles are defined:

implementation_profile_id	meaning
$E0_{16}$	conformant_implementation – a CA subunit with this implementation profile ID was created based on the AV/C CA Specification version 1.0. The set of features (commands and data structures) supported by this implementation is defined by the manufacturer. This profile ID applies to all broadcast systems.
$E1_{16}$	conformant_full_implementation – a CA subunit with this profile implementation is as described above, but it implements all of the commands and relevant data structures for the specified broadcast system, as defined in the AV/C CA Specification version 1.0. This profile ID applies to all broadcast systems.
All other values	reserved for future specification in this AV/C CA Specification

The *number_of_CA_system_ids* field indicates the number of CA systems the CA subunit is compatible with.

The *CA_system_id* fields identify a particular CA system. The values for *CA_system_id* are systemic dependent and in the DVB case they are defined in pr ETS 300468 Specification for Service Information (SI) in Digital Video Broadcasting (DVB) Systems. The *CA_system_id_length* field defines the length in bytes of the *CA_system_id* field.

For each CA subunit, there is also a CA status descriptor. This holds information about the CA subunit in general, and about the information that is on each of its source plugs. The data held within this structure is dynamic and is kept up to date by the CA subunit. A controller may examine this structure in order to determine the operational status of the CA subunit and its source plugs.

The general format of the CA status descriptor is shown in Figure 5(a).

The *descriptor_length* is the number of bytes for the CA subunit status descriptor structure, not including the *descriptor_length* field.

The CA subunit status area info block is illustrated separately in Figure 5(b) and the source plug status area info block is illustrated separately in Figure 5(c).

The general CA subunit status area info block contains status information about the CA subunit that is not specific to a particular destination or source plug.

The *compound_length* field specifies the number of bytes for the remainder of this information block (including any nested information blocks which may occur after the last well defined field).

The *primary_field_length* is the number of bytes for the remaining fields.

The *available_bandwidth_upper* and *available_bandwidth_lower* fields are read together and indicate the bandwidth capacity the CA subunit has available. The *available_bandwidth_upper* field indicates the integer amount of bandwidth available in Mbps. The *available_bandwidth_lower* indicates the fractional amount of bandwidth available in Mbps.

For example, if the CA subunit has 34.8Mbps of bandwidth available it would be represented as follows.

available_bandwidth_upper = $00\ 22_{16}$

available_bandwidth_lower = 08_{16}

The values of 0F FF_{16} for *available_bandwidth_upper* and FF_{16} for *available_bandwidth_lower* are reserved and indicate that the CA Subunit cannot determine the amount of available bandwidth.

This allows a device such as a tuner subunit to determine whether the CA subunit has enough spare capacity for additional services to be descrambled. If the CA subunit can support the simultaneous descrambling of multiple services from multiple sources then the *available_bandwidth* can be read in conjunction with the *destination_plug_status* fields to allow a controller to determine whether it is able to connect an additional source to the CA subunit.

With respect to the source plug status area info block of Figure 5(c), the *number of source plugs* field specifies the number of source plugs on the particular subunit and, hence, the number of *plug status info block* structures that are nested in this info block. The structures are located sequentially and not nested inside of each other. Most CA units will have only one source plug.

The *plug status info block (x)* fields are illustrated separately in Figure 5(d) and provide status information for each of the source plugs. There is one of these structures for each source plug on the CA subunit, even if the plug currently has no status information to report. As shown, the fields are each split into two general areas.

The *source_plug* field indicates the actual source plug number.

The *destination_plug* field indicates the *destination_plug* number that this *source_plug* is relevant to.

The *status* field describes the current situation of the *source_plug* according to the table below.

value	status description
00_{16}	No information instances are on the specified source plug.
10_{16}	A descrambled version of the service(s) requested for descrambling is(are) currently on the specified source plug.
20_{16}	A descrambled version of the service(s) requested should be on the specified source plug, however it is (they are) not currently on the plug.

Case 10_{16} is used when the CA subunit is functioning correctly and is outputting the requested service in a descrambled state. Case 20_{16} is used when the CA subunit has responded that it can descramble the selected service but at present the descrambled service is not available on the plug.

The CA subunit Status descriptor is specific to the CA subunit type; it has the following type value.

descriptor_type	meaning
80_{16}	CA Status Descriptor

The descriptor_type_specific_reference field does not exist because there is only one CA status descriptor for a CA subunit.

The CA subunit model does not feature any object lists.

The CA subunit commands are illustrated in Figure 6.

CA Enable

The CA enable command is used to instruct the CA subunit as to which service it should descramble. The command is broadcast specific. The CA enable control command is illustrated in Figure 7(a) with the broadcast systems specific data illustrated in Figure 7(b) and the elementary PID definition illustrated in Figure 7(c).

The *system_id* field denotes which broadcast system the following command relates to. The following systems are currently defined:

system_id	name
20_{16}	DVB
Other values	reserved

The *broadcast_system_specific_data* field contains operands that are specific to the system being used.

For the DVB System the operands of Figure 7(b) fully specify the service to be descrambled. The PID (Packet Identifier) for each component of the service is identified.

If one of the component subunits of a controller is a tuner subunit then the controller has the service_id and PID values available to it privately. However, if a controller wishes to make use of another suitable receiving device then the controller must inspect the service and component descriptors of the tuner subunit in the receiving device. The controller must define the PIDs of the components of the desired service.

A separate CA_ENABLE command is sent for each service that is to be descrambled. The action field is used to update the list of selected services stored in the CA subunit. The following values are defined.

action	value
add	00_{16}
update	10_{16}
remove	20_{16}
remove_all	30_{16}
reserved	Other values

When action is set to "add" the selected service is added to the list of services selected for descrambling. "update" indicates that a selected service should be modified in some way. Since the list management commands only act at the program level, any changes at the elementary stream level in an existing service must be signalled by an 'update' command with the complete elementary stream list re-sent. "remove" allows one service to be deleted from the list. "remove_all" is used when the descrambling of all services is no longer required.

The *service_id* field specifies the service to which the program_map_PID is applicable.

The *number_of_elementary_PID_definitions* field indicates the number of following elementary_PID fields.

Each of the elementary PID fields correspond to the example illustrated in Figure 7(c).

The *stream_type* field identifies the type of service element carried within the packets with the PID whose value is specified by the elementary _PID. The values are defined in table 2-29 of ISP/IEC 13818-1 Generic Coding of Moving Picture and Associated Audio Systems.

The *elementary_PID* field specifies the PID of the transport stream packets that carry the associated service element.

Having received a CA enable control command, the CA subunit will produce a response as illustrated in Figure 8(a), with the broadcast systems specific data illustrated in Figure 8(b).

The operands have the same meaning as for the CA enable control command and the response format is the same as for the control command with the addition of the status operand.

In the case where the action is "add" or "update" and the CA enable command is successful, the response will be ACCEPTED. *status* can take on the following values. The value of *status* reflects the *action*.

action	status	Value
add	descrambling	00_{16}
add	descrambling possible under conditions (purchase dialog)	01_{16}
add	descrambling possible under conditions (technical dialog)	02_{16}
update	descrambling	10_{16}
update	descrambling possible under conditions (purchase dialog)	11_{16}
update	descrambling possible under conditions (technical dialog)	12_{16}
remove	remove_successful	20_{16}
remove_all	remove_successful	30_{16}

In the case where an add or update command is successful then the response is scrambling However there may be some cases where it is theoretically possible to descramble the service but there are certain conditions that must first be satisfied. The scrambling possible under conditions messages are returned in this case. There are two types of conditional responses, urchase dialogue and echnical dialog Both dialogs require an interaction with the user via the man machine interface (MMI).

The purchase dialog is required, for example, where the user has requested a pay per view service. Here a dialog with the user might be required to confirm the cost of the service before viewing can commence.

The technical dialog is required when there is a technical issue to overcome before the CA subunit can determine whether it is possible or not to descramble the service. This could occur, for example, when the user needs to insert the smart card.

In the case where the CA_ENABLE command is unsuccessful the response frame will use the response code of REJECTED. The *status* field will take on the following values to reflect the nature of the error. The value of *status* reflects the *action*.

action	status	Value
add	descrambling not possible	80_{16}
add	descrambling not possible (because no entitlement)	81_{16}
add	descrambling not possible (for technical reasons)	82_{16}
add	descrambling not possible (Insufficient bandwidth in CA subunit)	83_{16}
add	descrambling not possible (Incompatible CA system)	84_{16}
update	descrambling not possible	90_{16}
update	descrambling not possible (because no entitlement)	91_{16}
update	descrambling not possible (for technical reasons)	92_{16}
update	descrambling not possible (Insufficient bandwidth in CA subunit)	93_{16}
update	descrambling not possible (Incompatible CA system)	94_{16}
remove	remove failed –service not present	$A0_{16}$
remove	remove failed – unknown reason	$A1_{16}$
remove_all	remove failed – service not present	$B0_{16}$
remove_all	remove failed – unknown reason	$B1_{16}$

The CA enable command can also be sent with a ctype of STATUS and NOTIFY. These are signified by "S" and "N" in Figure 6. The status and notify command frames have the same form as the control command. The command is used to determine whether the CA subunit is capable of descrambling the selected service. The broadcast system specific data for DVB systems specific operand is illustrated in Figure 9. The fields are the same as for the control command.

In response to a CA enable status and notify command, the CA subunit makes a response. The broadcast system specific data for the DVB system specific operands is illustrated in Figure 10.

The fields are the same as for the COMMAND response with the exception of the *status* field, which can take the values defined below. The "remove" action is not valid for STATUS or NOTIFY commands.

action	status	Value
add	descrambling will be possible	00_{16}
add	descrambling will be possible under conditions (purchase dialog)	01_{16}
add	descrambling will be possible under conditions (technical dialog)	02_{16}
update	descrambling will be possible	10_{16}
update	descrambling will be possible under conditions (purchase dialog)	11_{16}
update	descrambling will be possible under conditions (technical dialog)	12_{16}
add	descrambling will not be possible	80_{16}
add	descrambling will not be possible (because no entitlement)	81_{16}
add	descrambling will not be possible (for technical reasons)	82_{16}
add	descrambling will not be possible (Insufficient bandwidth in CA subunit)	83_{16}
add	descrambling will not be possible (Incompatible CA system)	84_{16}
update	descrambling will not be possible	90_{16}
update	descrambling will not be possible (because no entitlement)	91_{16}
update	descrambling will not be possible (for technical reasons)	92_{16}
update	descrambling will not be possible (Insufficient bandwidth in CA subunit)	93_{16}
update	descrambling will not be possible (Incompatible CA system)	94_{16}

CA Entitlement

The CA entitlement command may be used by EPG (Electronic Program Guide) applications to interrogate the CA subunit in order to determine what entitlement the user has to services found in the electronic program guide. For instance, when displaying the EPG, having interrogated the CA subunit to determine what programs can be descrambled, the EPG can indicate which of the programs the user is able to view. The command can be used with a ctype of STATUS and NOTIFY. This command does not prevent EPG and CA applications from the same or cooperating suppliers to develop private means of passing entitlement information. This command can be used by independent EPGs to interrogate CA modules.

The CA entitlement command is illustrated in Figure 11(a) with the broadcast systems specific data for the DVB system being illustrated in Figure 11(b).

The system ID field has the same meaning as for the CA enable command.

The operands network ID, original network ID, transport stream ID, service ID and event ID specify the service that the entitlement query is for. The event ID is fully qualified by the other location identifiers in the service information.

In response to a CA entitlement command, the CA subunit issues a response illustrated by Figure 12(a) with the broadcast system specific data for the DVB system illustrated in Figure 12(b).

The operands *network_id*, *original_network_id*, *transport_stream_id*, *service_id* and *event_id* are the same as for the command. The *entitlement_status* field denotes the whether or not the user has entitlement to the selected service.

value	entitlement_status	Description
00	entitlement unknown	The CA subunit cannot determine the entitlement status for this service
01	entitlement available	Entitlement for this service is currently available
02	entitlement not available	Entitlement for this event is not currently available and cannot be made available by any user dialogue with the CA subunit
03	user dialogue required	Entitlement is not currently available but could be made available after a user dialogue with the CA subunit
04	user dialogue complete unknown	The user dialogue is complete the entitlement is unknown
05	user dialogue complete available	The user dialogue is complete and entitlement has been granted
06	user dialogue complete not available	The user dialogue is complete and entitlement has not been granted
other values	reserved	The remaining values are reserved for future use

Security

Although the concept of the CA Subunit is to allow generic receivers to work with multiple CA systems there may be some cases when a service provider will wish to associate a certain CA Subunit with a certain IRD (Integrated Receiver Decoder). In this case authentication is used between the CA Subunit and the IRD to ensure that each device only works with its respective partner.

The SECURITY command is illustrated in Figure 13 and is independent of broadcast system as it is uniquely defined for each application. The authentication protocol is a process whereby the IRD and CA Subunit pass between themselves control codes to allow each device to satisfy itself that the other is genuine. The authentication protocol could be as simple as transferring two known keys between the devices or a more complex key exchange based upon, for example, public key protocols.

The *category* field defines the authentication and key exchange protocol that is used in the following *category dependant field.*

Implementation

The following provides an explanation as to how the CA Subunit can be implemented and the procedure that can be followed to make use of the CA Subunit.

The NCAM is a logical collection of subunits that provide the required functionality to implement a networked conditional access system. The CA subunit is the core of the system and relies on other subunits to provide a source and sink for the

material that requires descrambling and communication with both the user and outside world. As such the CA subunit should be aware of the tuner subunit and panel subunit.

The NCAM can be implemented with only the tuner, CA and Panel subunits; these are the minimum requirements. The resources that the CA system may also require such as a modem and/or smart card reader can be implemented and accessed privately when they form part of the same unit.

The procedure for decoding a scrambled transport stream is described with reference to Figure 14. The following assumes that the tuner subunit will be the source of the scrambled stream, either an off air signal via a suitable front end or directly from the demux via an alternative source such as a DVCR. The user will a make a channel selection and the tuner subunit will detect that the stream is scrambled.

The controller can make an intelligent prediction as to which CA subunit to use based upon the CA_*system_id* field from the transport stream and CA_*system_id* of the CA subunit. For example in Figure 15 satellite IRD is connected to a CA Subunit via 1394.

The controller establishes an isochronous channel between the tuner and CA subunits to transmit the scrambled service to the CA subunit. A second channel from the CA subunit to the desired sink, this can be the unit that originates the scrambled source material or a separate unit, is set up. The 5C Copy Protection system or any other suitable alternative copy protection mechanism can be used to protect the descrambled transport stream from unauthorised copying.

The controller then sends the CA_ENABLE command to inform the CA subunit of which service or services it would like descrambled. When the CA subunit receives the CA_ENABLE command it determines whether or not it is capable of descrambling the selected service. This may involve setting up a dialogue with the user to determine whether they are prepared to pay for the service or request them to insert

their bank card or pin number. Some communication with the outside world via the modem may be required.

If following the user dialogue the CA subunit is capable of descrambling the selected services it updates its internal status registers and starts output the descrambled data.

Due to the nature of AV/C commands whereby each command requires a response, if the original CA_ENABLE command is met with a REJECTED response due to a user or technical dialogue being required then once the dialogue is resolved the controller will not know the outcome. Therefore if a CA_ENABLE command is rejected for dialogue reasons then the controller should send a NOTIFY command to be informed when the state of the CA subunit changes.

EMM Handling

In some implementations of a DTV receiver the CA module can receive EMMs whilst the DTV is in standby and on power states. This allows the CA module to continually update the entitlement that the user has.

In a network environment the TS must be routed to the CA subunit to allow the subunit to process the EMM packets. This means that if the CA subunit remains powered off or a TS is not connected to it for a period of time then the entitlement stored in the CA subunit may become out of date. Therefore at periodic intervals the CA subunit should contact the tuner subunit and request the TS for a period of time to allow it to update the EMMs. This should be done at times when the user experience will not be compromised. The controller should ensure that the channel is not changed while the user is watching a particular service.

No Tuner Subunit

The benefit of using a CA subunit in a network where a tuner subunit also exists comes when the controller is external to both the unit that contains the tuner subunit and the unit that contains the CA subunit. This allows the controller to discover the services that the tuner subunit is capable of receiving and can instruct the CA subunit to descramble a number of these services.

In some cases the CA subunit will exist in a network where there is no tuner subunit. In this case in order for a device to make use of the CA subunit the controller must exist in the same unit as that of the signal source. The controller must be capable of privately inspecting the transport stream and determining the PIDs of the elements of the service it wishes descrambled. Again the EMM stream must be included with the PIDs of the elements that are to be descrambled.

CLAIMS

1. A conditional access subunit for connection to an IEEE 1394 network, the subunit including:

means to receive AV/C Conditional Access Commands over the IEEE 1394 network from another subunit; and

means to transmit AV/C responses over the IEEE 1394 network in response to the received AV/C Conditional Access Commands.

2. A subunit for use with a conditional access subunit on an IEEE 1394 network, the subunit including:

means to transmit AV/C Conditional Access Commands over the IEEE 1394 network to the conditional access subunit; and

means to receive AV/C responses from the conditional access subunit over the IEEE 1394 network in response to the transmitted AV/C Conditional Access Commands.

3. A method of providing a Conditional Access Module on an IEEE 1394 network, the method comprising:

defining a Conditional Access Module as a Conditional Access Subunit of the IEEE 1394 network;

providing AV/C Conditional Access Commands to allow communication between the Conditional Access Subunit and other Subunits on the network.

4. A subunit according to claim 1 or 2 or a method according to claim 3 wherein the AV/C Conditional Access Commands include a CA enable command.

5. A subunit or method according to claim 4 wherein the AV/C op code for the CA enable command is CC_{16}.

6. A subunit or method according to claim 4 or 5 wherein the CA enable command includes a system ID for identifying the broadcast system to which the command relates.

7. A subunit or method according to claims 4, 5 or 6 wherein CA enable control commands include an action operand which is able to represent at least add, update, remove and remove all actions.

8. A subunit or method according to any one of claims 4 to 7 wherein CA enable control command responses include an action operand corresponding to the action operand of a received CA enable control command and a status operand wherein, for an action operand representing an add action, the status operand is able to represent at least descrambling, descrambling possible under conditions (purchase dialogue) and descrambling possible under conditions (technical dialogue), for an action operand representing an update action, the status operand is able to represent at least descrambling, descrambling possible under conditions (purchase dialogue) and descrambling possible under conditions (technical dialogue status), for an action operand representing a remove action, the status operand is able to represent at least a remove successful status and, for an action operand representing a remove all action, the status operand is able to represent at least a remove successful status.

9. A subunit or method according to any one of claims 4 to 8 wherein CA enable status and notify commands include an action operand able to represent at least one of an add, update, remove and remove all action.

10. A subunit or method according to any one of claim 9 wherein CA enable status and notify command responses include an action operand corresponding to the action operand of the CA enable status and notify command and a status operand wherein, for an action operand representing an add action, the status operand is able to represent at least one of descrambling will be possible, descrambling will be possible under conditions (purchase dialogue), descrambling will be possible under conditions (technical dialogue), descrambling will not be possible, descrambling will not be possible (because no entitlement), descrambling

will not be possible (for technical reasons), descrambling will not be possible (insufficient bandwidth in CA subunit) and descrambling will not be possible (incompatible CA system) and for an action operand representing an update action, the status operand is able to represent at least descrambling will be possible, descrambling will be possible under conditions (purchase dialogue), descrambling will be possible under conditions (technical dialogue), descrambling will not be possible, descrambling will not be possible (because no entitlement), descrambling will not be possible (for technical reasons), descrambling will not be possible (insufficient bandwidth in CA subunit) and descrambling will not be possible (incompatible CA system).

11. A subunit or method according to any one of claims 4 to 10 wherein the CA enable command includes a service ID operand for specifying the service to which the program map PID is applicable.

12. A subunit or method according to any one of claims 4 to 11 wherein the CA enable command includes an operand for specifying the number of elementary PID definitions to follow, together with operands including elementary PID definitions.

13. A subunit or method according to claim 12 wherein each of the elementary PID definitions include a stream type operand for identifying the type of service element carried within the packets with the PID whose value is specified by the elementary PID and elementary PID operands for specifying the PID of the transport stream packets that carry the associated service element.

14. A subunit or method according to any preceding claim wherein the AV/C Conditional Access Commands include a CA entitlement command.

15. A subunit or method according to claim 14 wherein the AV/C opcode for the CA entitlement command is CD_{16}.

16. A subunit or method according to claim 14 or 15 wherein the CA entitlement command includes a system ID for identifying the broadcast system to which the command relates.

17. A subunit or method according to claim 14, 15 or 16 wherein the CA entitlement command includes operands defining broadcast systems specific data.

18. A subunit or method according to claim 17 wherein the broadcast systems specific data is able to represent at least the network ID, the original network ID, the transport stream ID, the service ID and the event ID.

19. A subunit or method according to any one of claims 14 to 18 wherein, for a CA entitlement command response, the response has an operand able to represent entitlement status.

20. A subunit or method according to claim 19 wherein the entitlement status operand is able to represent at least entitlement unknown, entitlement available, entitlement not available, user dialogue required, user dialogue complete unknown, user dialogue complete available and user dialogue complete not available.

21. A subunit or method according to any preceding claim wherein the AV/C Conditional Access Commands include a security command.

22. A subunit or method according to claim 21 wherein the AV/C opcode for the security command is $0F_{16}$.

23. A subunit or method according to claim 20 or 21 wherein the security command includes operands for defining authentication and key exchange protocols.

24. A subunit or method according to claim 21, 22 or 23 wherein the subunit will only transmit data once it has received appropriate authentication from the receiving subunit.

25. A conditional access subunit for connection to an IEEE 1394 network for use in descrambling a transport stream received over the network wherein the conditional access subunit, having descrambled the transport stream, introduces a local scrambling before retransmitting the transport stream to other subunits on the network, such that only authorised subunits on the network capable of local descrambling can receive the information in the transport stream.

26. A conditional access subunit for connection to an IEEE 1394 network having a tuner subunit, the conditional access subunit having means for periodically contacting the tuner subunit to request the received transport stream for a period of time sufficient to allow the conditional access subunit to update the entitlement management messages stored in the conditional access subunit.

27. An IEEE 1394 network including a conditional access subunit according to claim 26, a tuner subunit and a control subunit wherein the control subunit ensures that the request from the conditional access subunit to the tuner unit does not cause the tuner unit to change channel while a user is making use of a particular service.

28. A tuner device having an embedded conditional access subunit according to any one of claims 1, 2 and 4 to 26.

Fig.1.

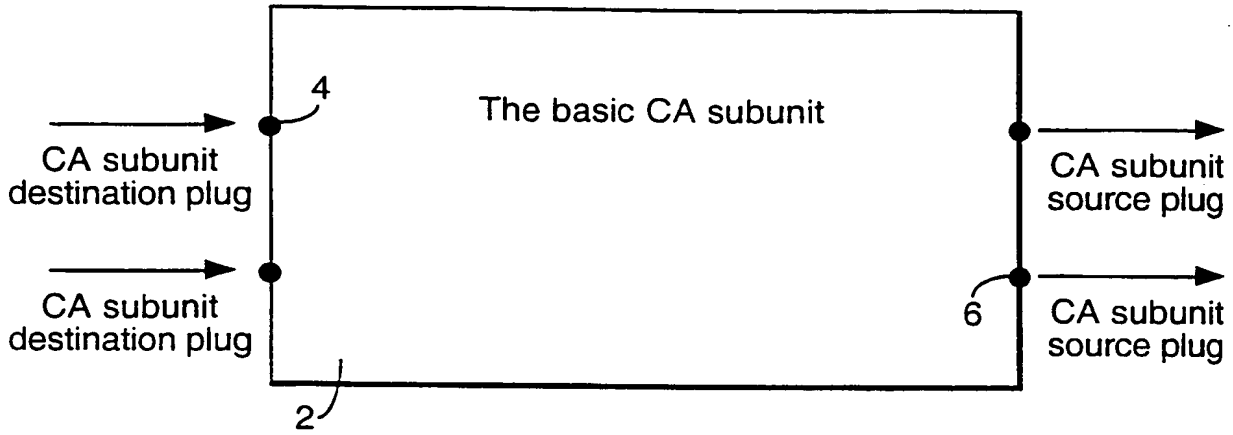

The basic CA subunit
4
CA subunit destination plug
CA subunit destination plug
CA subunit source plug
6
CA subunit source plug
2

Fig.2.

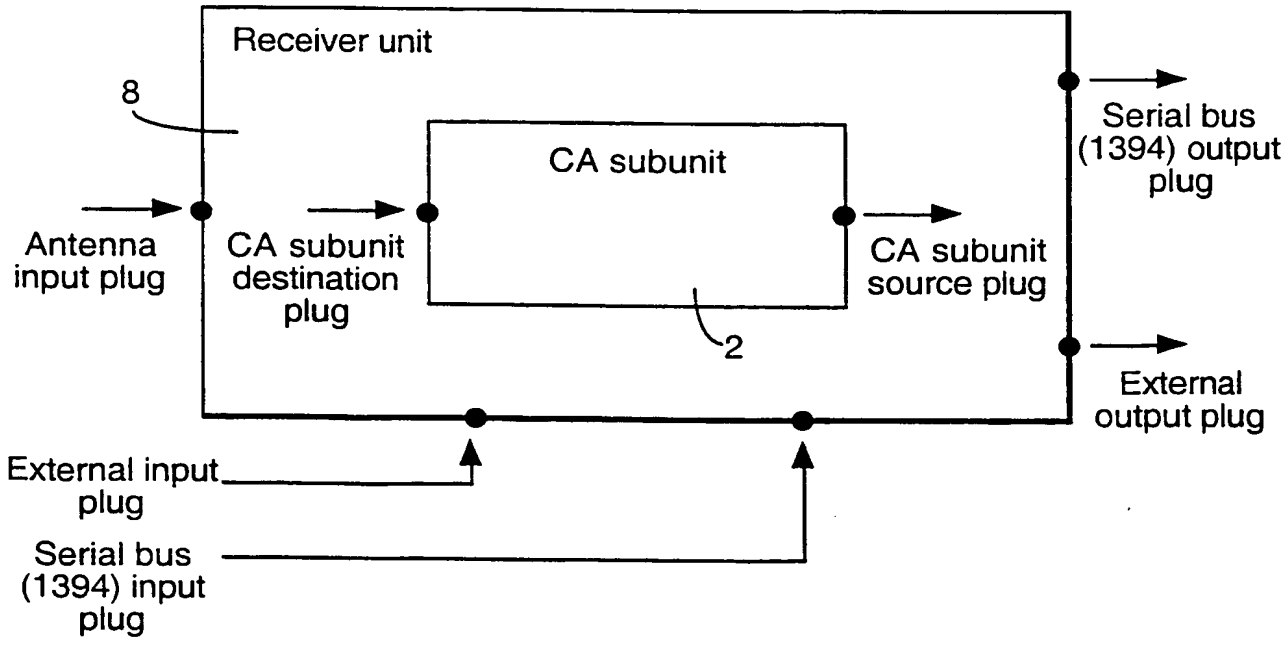

Receiver unit
8
CA subunit
Antenna input plug
CA subunit destination plug
CA subunit source plug
2
Serial bus (1394) output plug
External output plug
External input plug
Serial bus (1394) input plug

Fig.3.

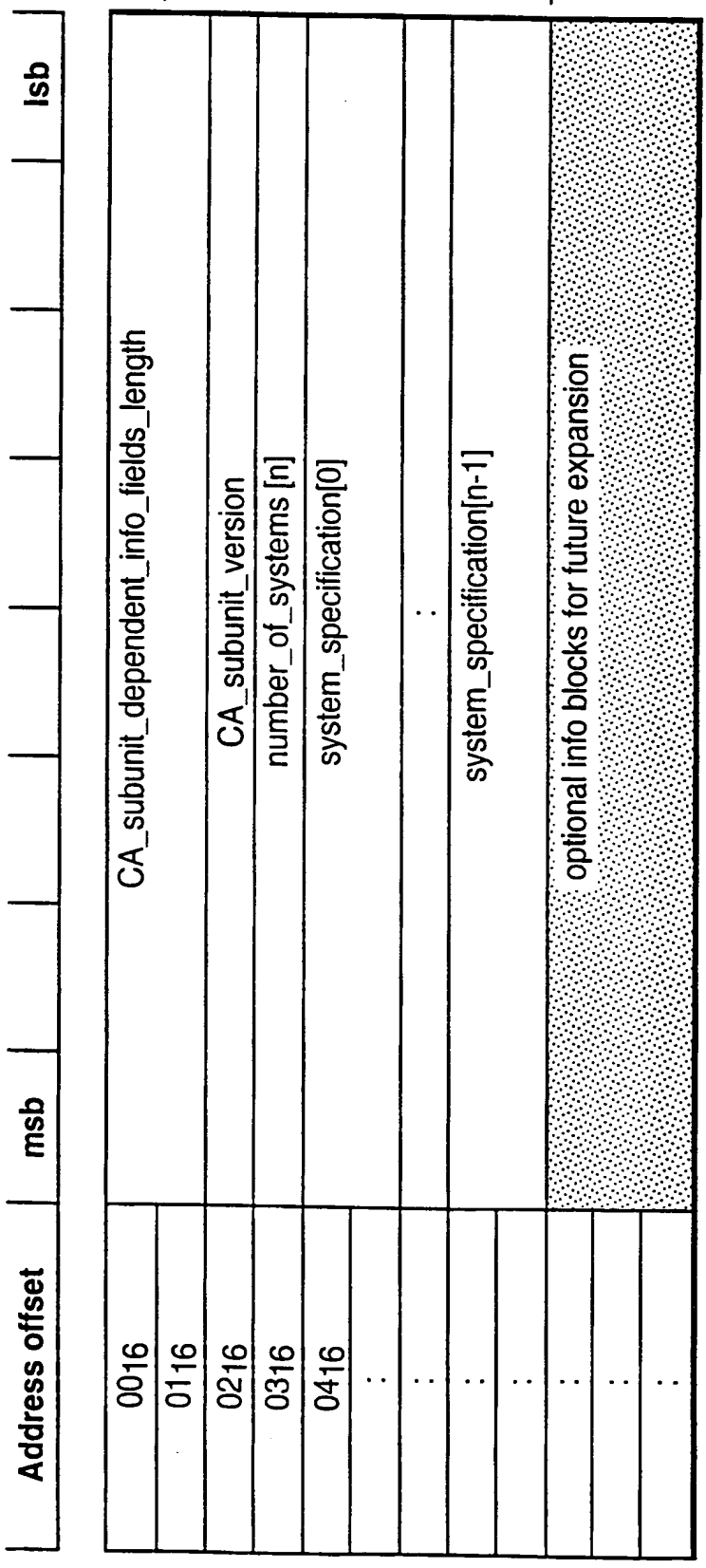

Address offset
msb
lsb
0016
0116
0216
0316
0416
CA_subunit_dependent_info_fields_length
CA_subunit_version
number_of_systems [n]
system_specification[0]
system_specification[n-1]
optional info blocks for future expansion

Fig.4.

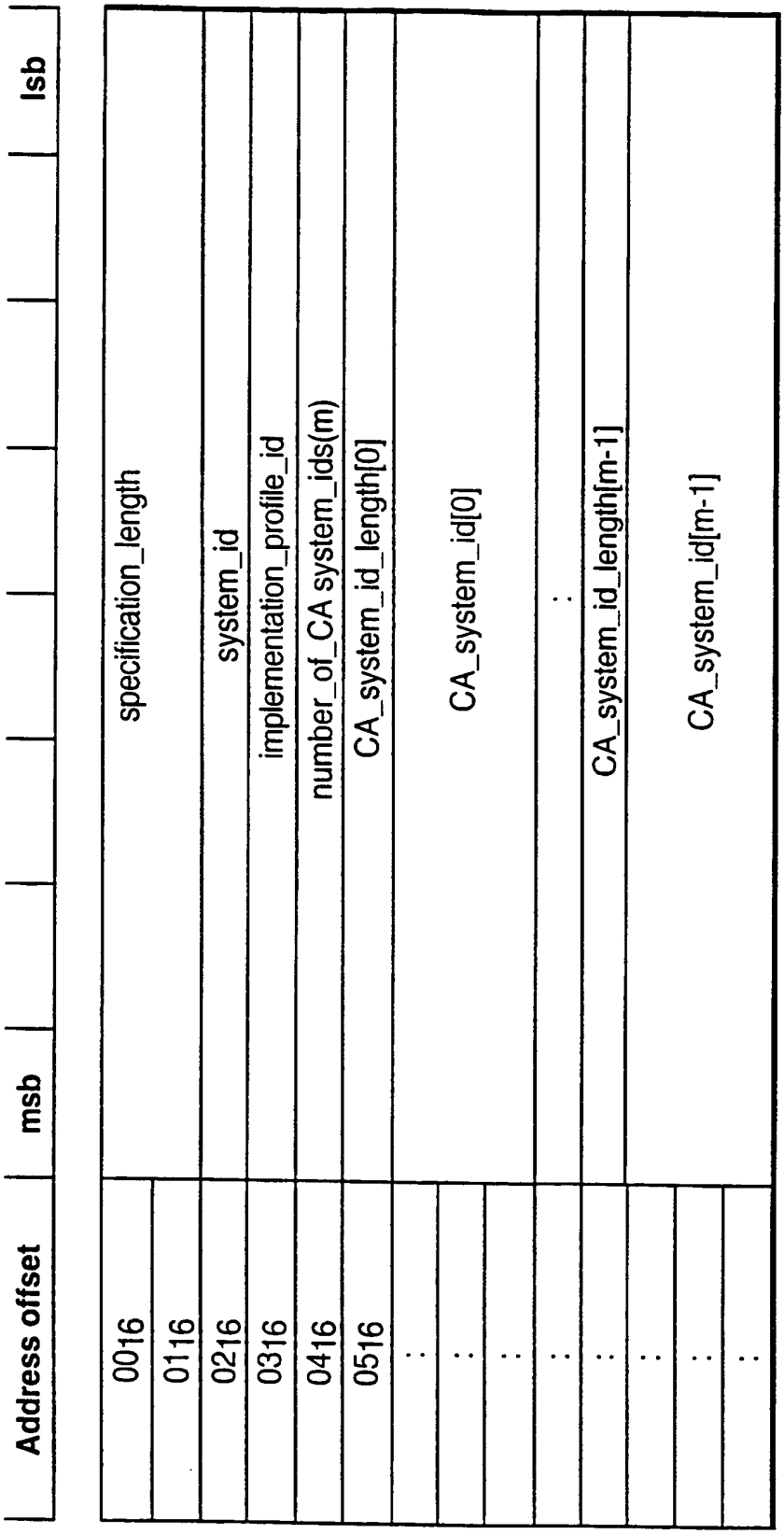

Address offset
msb
lsb
0016
0116
0216
0316
0416
0516
specification_length
system_id
implementation_profile_id
number_of_CA system_ids(m)
CA_system_id_length[0]
CA_system_id[0]
CA_system_id_length[m-1]
CA_system_id[m-1]

Fig.5(a).

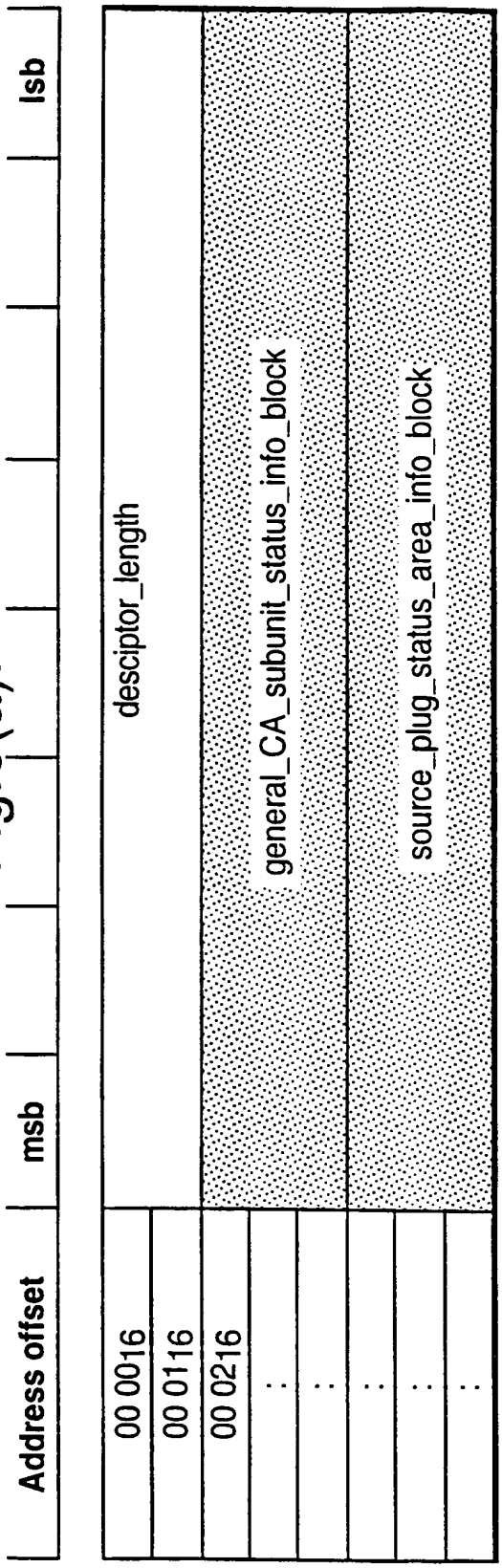

Address offset
msb
lsb
desciptor_length
general_CA_subunit_status_info_block
source_plug_status_area_info_block
00 0016
00 0116
00 0216

Fig.5(b).

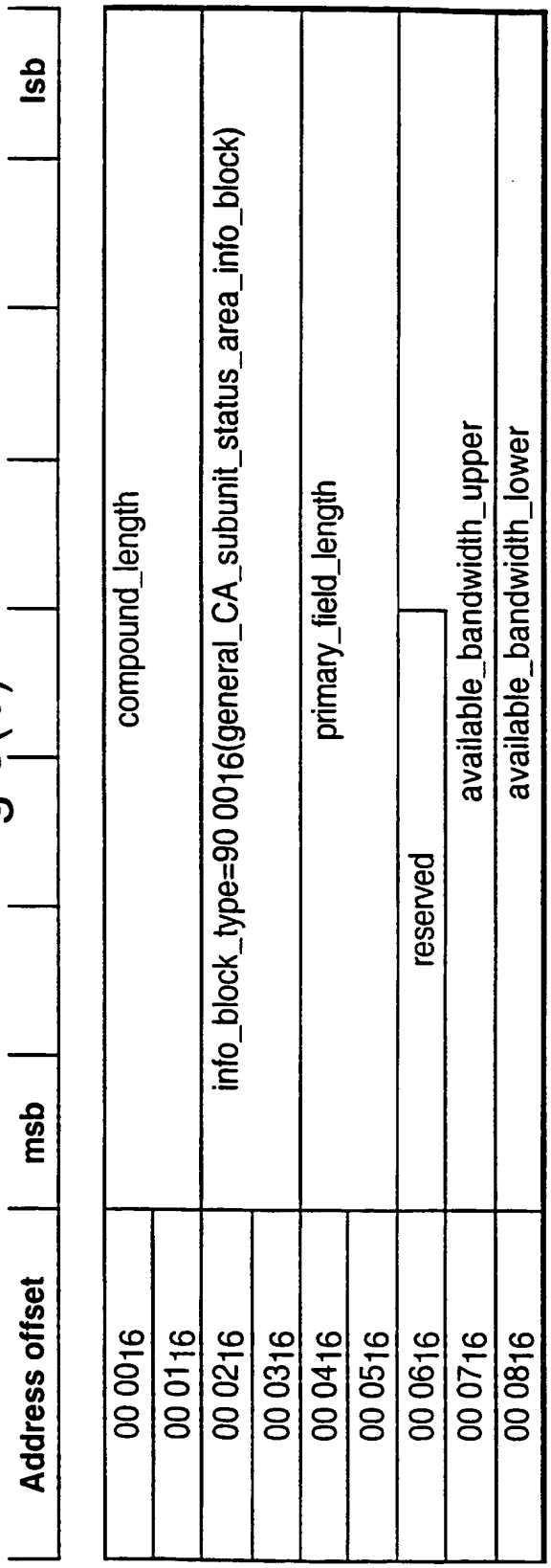

Address offset
msb
lsb
compound_length
info_block_type=90 0016(general_CA_subunit_status_area_info_block)
primary_field_length
reserved
available_bandwidth_upper
available_bandwidth_lower
00 0016
00 0116
00 0216
00 0316
00 0416
00 0516
00 0616
00 0716
00 0816

Fig.5(c).

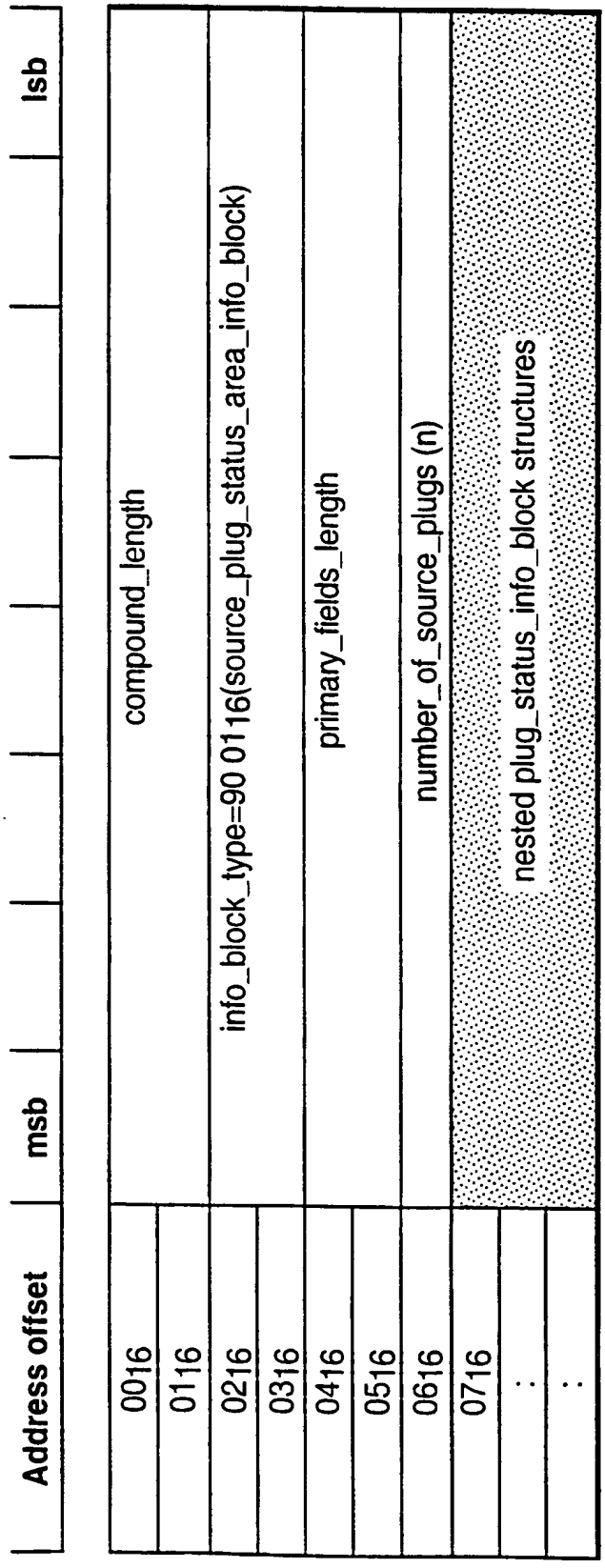

Address offset
msb
lsb
0016
0116
compound_length
0216
0316
info_block_type=90 0116(source_plug_status_area_info_block)
0416
0516
primary_fields_length
0616
number_of_source_plugs (n)
0716
nested plug_status_info_block structures

Fig.5(d).

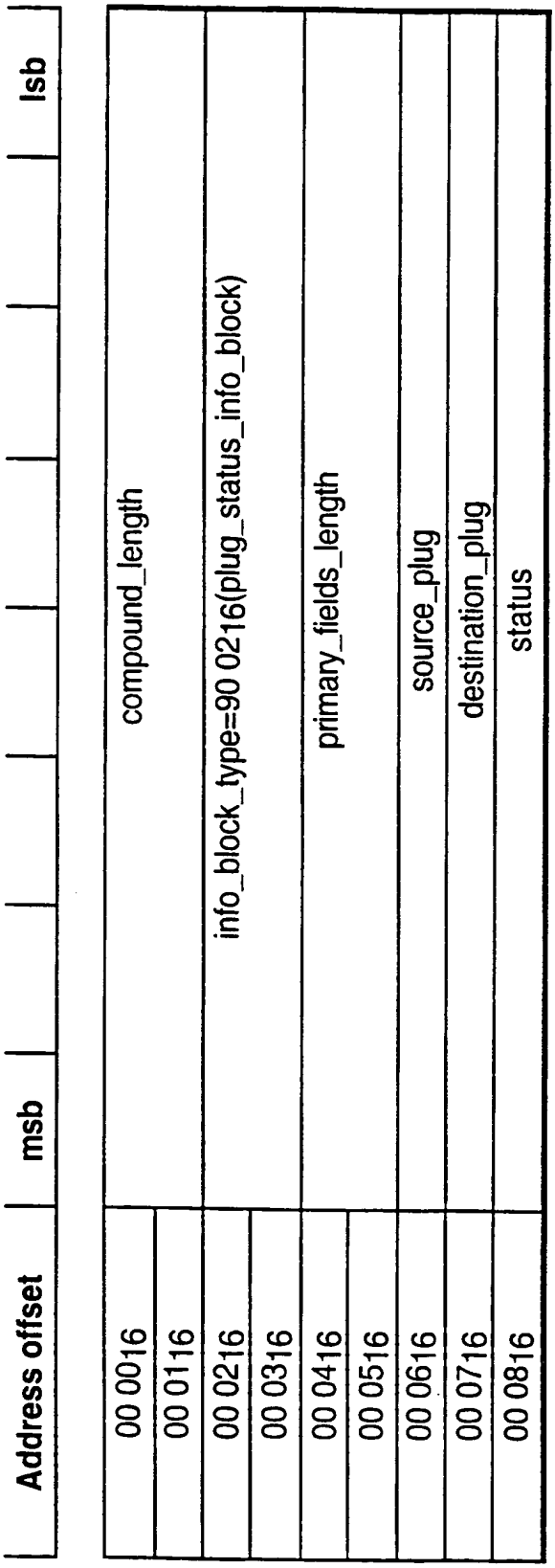

Address offset
msb
lsb
compound_length
info_block_type=90 0216(plug_status_info_block)
primary_fields_length
source_plug
destination_plug
status
00 0016
00 0116
00 0216
00 0316
00 0416
00 0516
00 0616
00 0716
00 0816

Fig.6.

Opcode	Value	ctype			Comments
		C	S	N	
CA_ENABLE	CC16	✓	✓	✓	Used to instruct the CA subunit to begin descambling the service defined in the broadcast specific data
CA_ENTITLEMENT	CD16	–	✓	✓	Used to allow a controller to query the CA subunit to determine whether the user has entitlement for a specified service
SECURITY	OF16	✓	✓	✓	Used for validation purposes between a controller and the CA subunit

Fig.7(a).

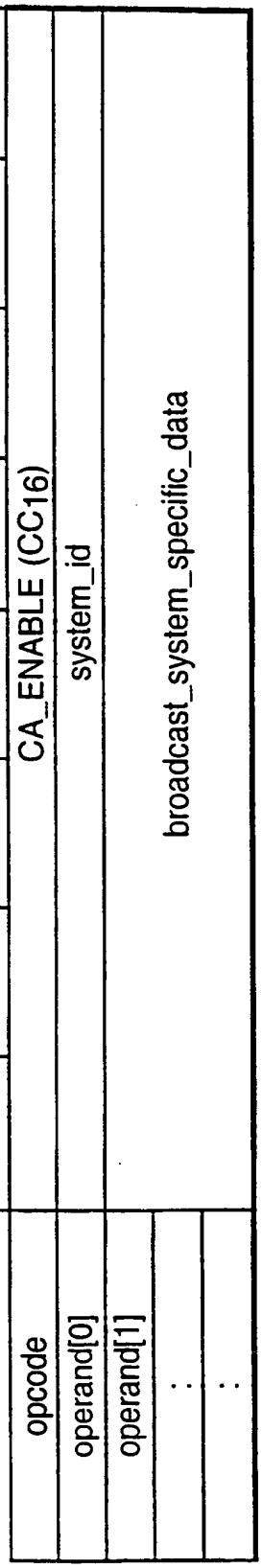


Fig.7(b).

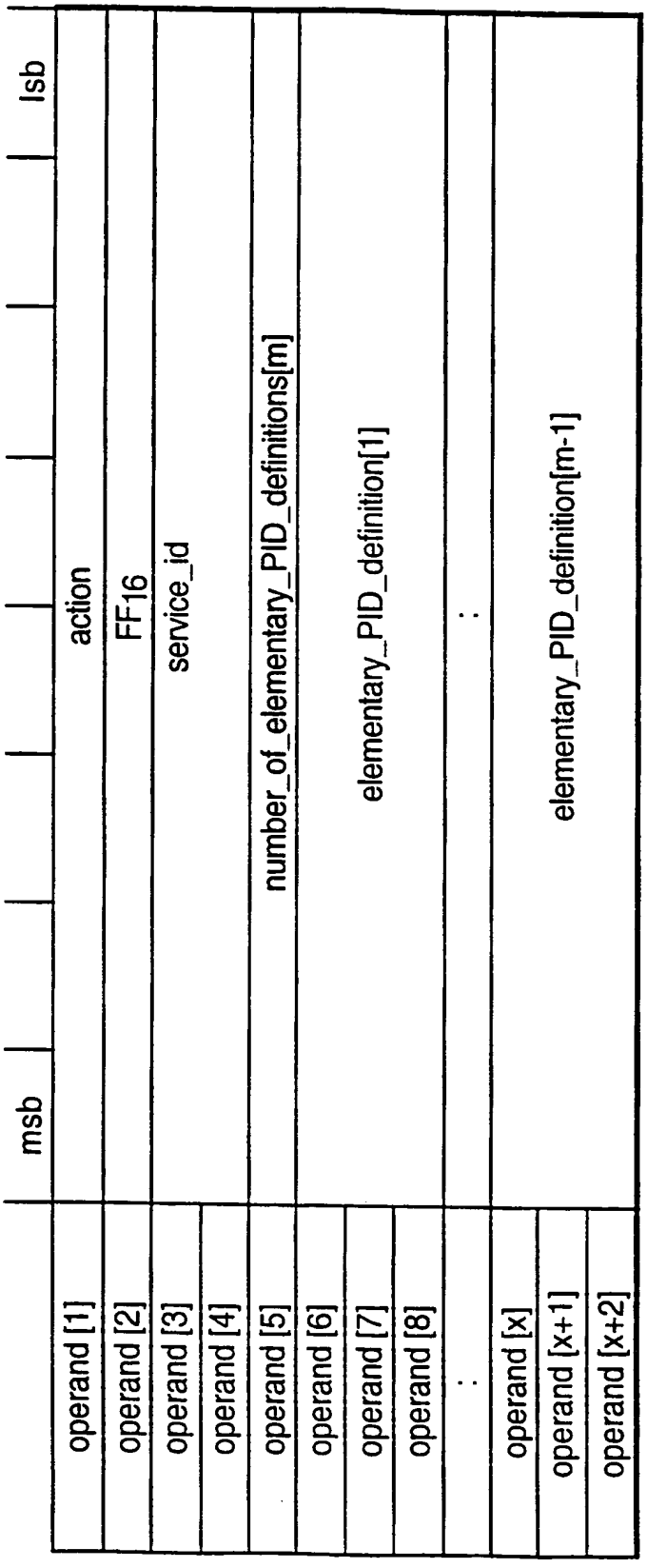

msb
lsb
operand [1]
action
operand [2]
FF16
operand [3]
service_id
operand [4]
operand [5]
number_of_elementary_PID_definitions[m]
operand [6]
elementary_PID_definition[1]
operand [7]
operand [8]
operand [x]
elementary_PID_definition[m-1]
operand [x+1]
operand [x+2]

Fig.7(c).

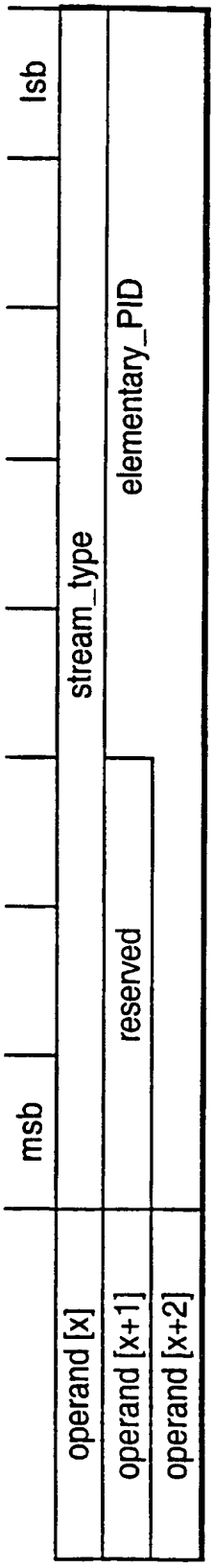

msb
lsb
operand [x]
stream_type
operand [x+1]
reserved
elementary_PID
operand [x+2]

Fig.8(a).

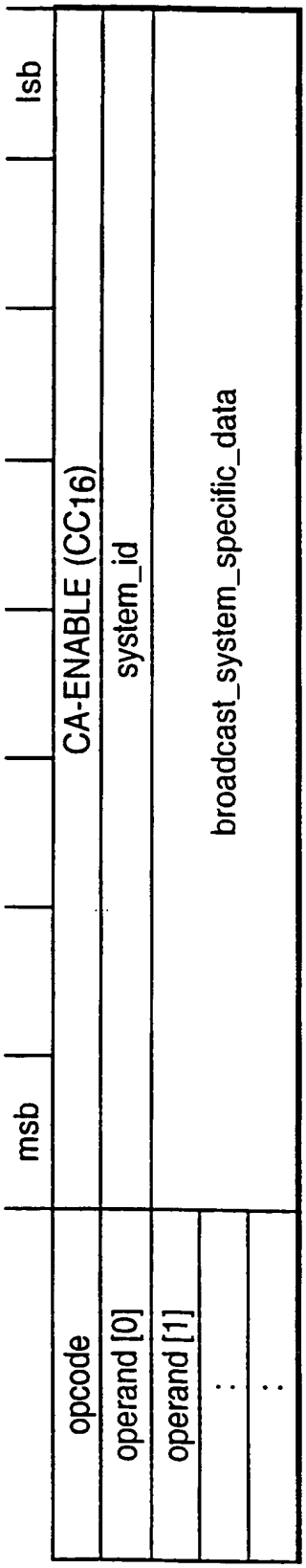

msb
lsb
opcode
CA-ENABLE (CC16)
operand [0]
system_id
operand [1]
broadcast_system_specific_data

Fig.8(b).

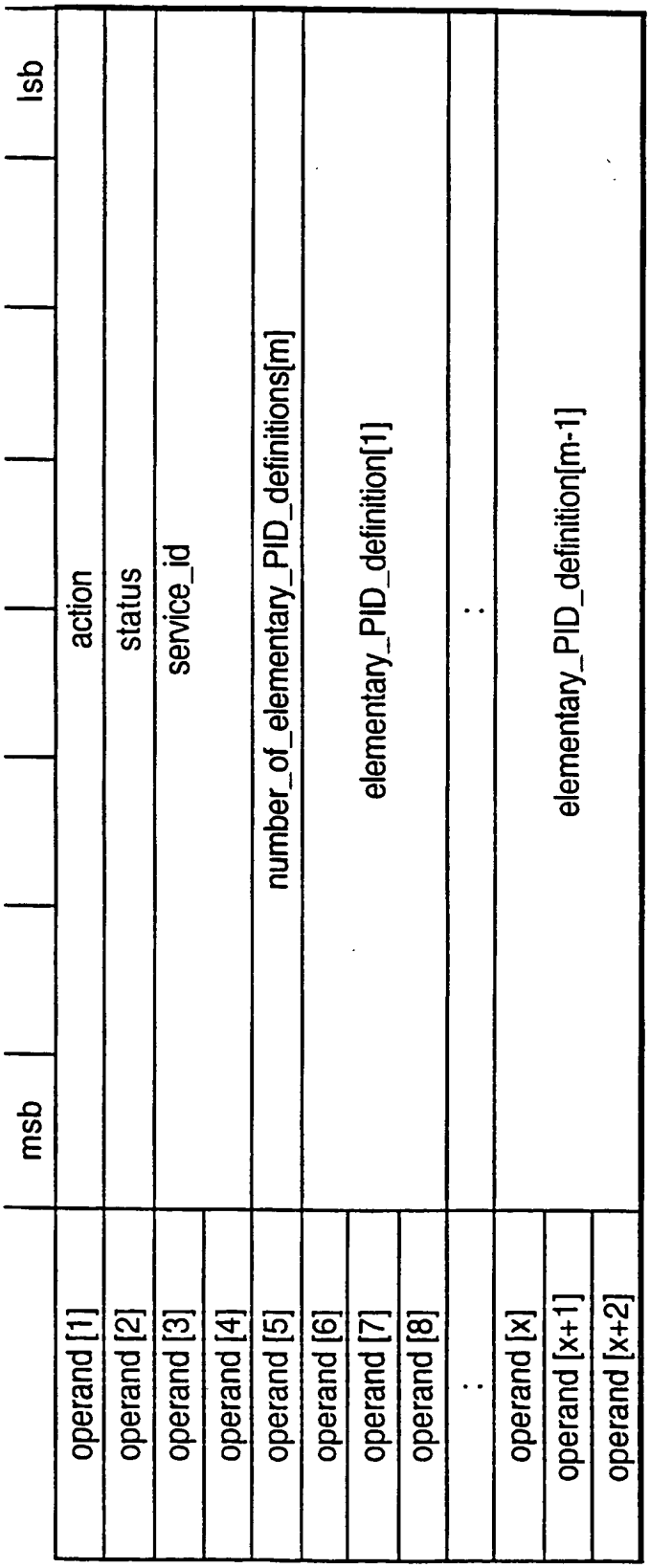

msb
lsb
operand [1]
action
operand [2]
status
operand [3]
service_id
operand [4]
operand [5]
number_of_elementary_PID_definitions[m]
operand [6]
elementary_PID_definition[1]
operand [7]
operand [8]
operand [x]
elementary_PID_definition[m-1]
operand [x+1]
operand [x+2]

Fig.9.

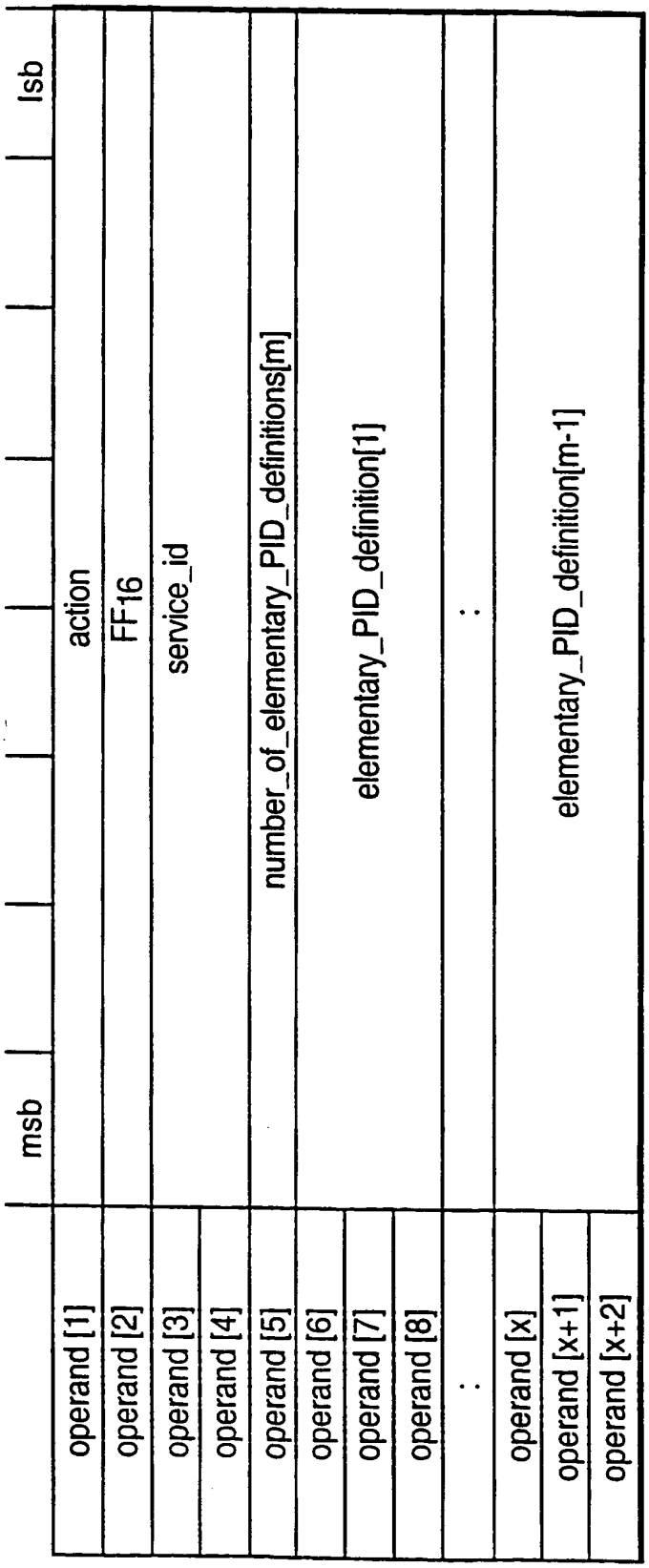

msb
lsb
action
FF16
service_id
number_of_elementary_PID_definitions[m]
elementary_PID_definition[1]
:
elementary_PID_definition[m-1]
operand [1]
operand [2]
operand [3]
operand [4]
operand [5]
operand [6]
operand [7]
operand [8]
:
operand [x]
operand [x+1]
operand [x+2]

Fig.10.

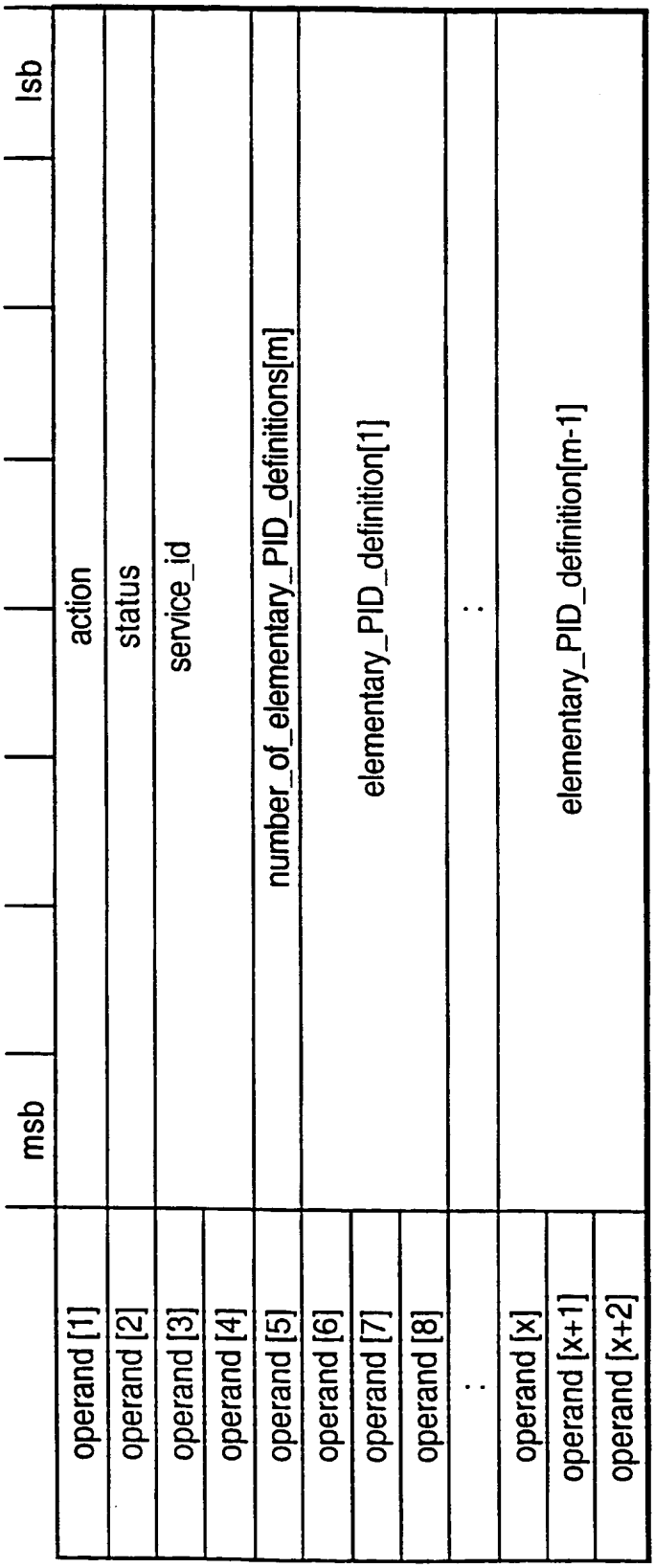

msb
lsb
action
status
service_id
number_of_elementary_PID_definitions[m]
elementary_PID_definition[1]
elementary_PID_definition[m-1]
operand [1]
operand [2]
operand [3]
operand [4]
operand [5]
operand [6]
operand [7]
operand [8]
operand [x]
operand [x+1]
operand [x+2]

Fig.11(a).

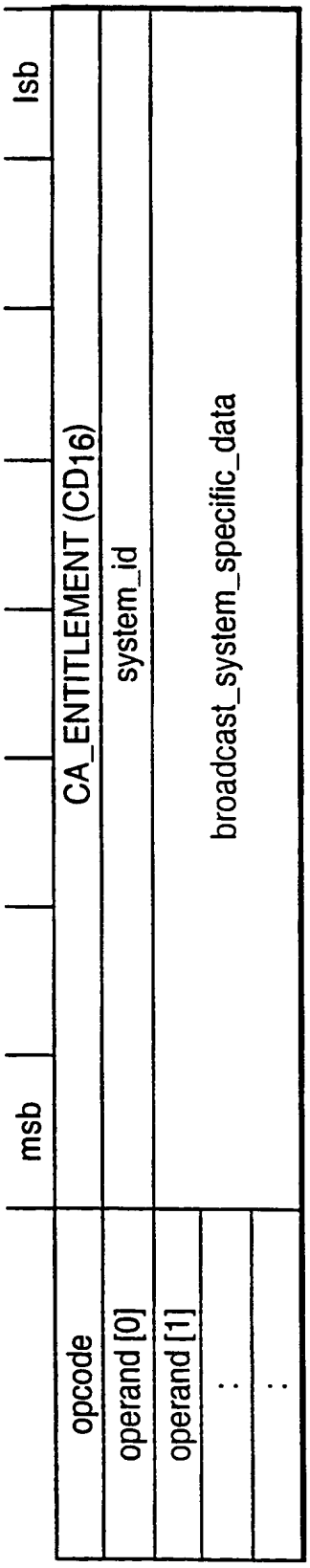


Fig.11(b).

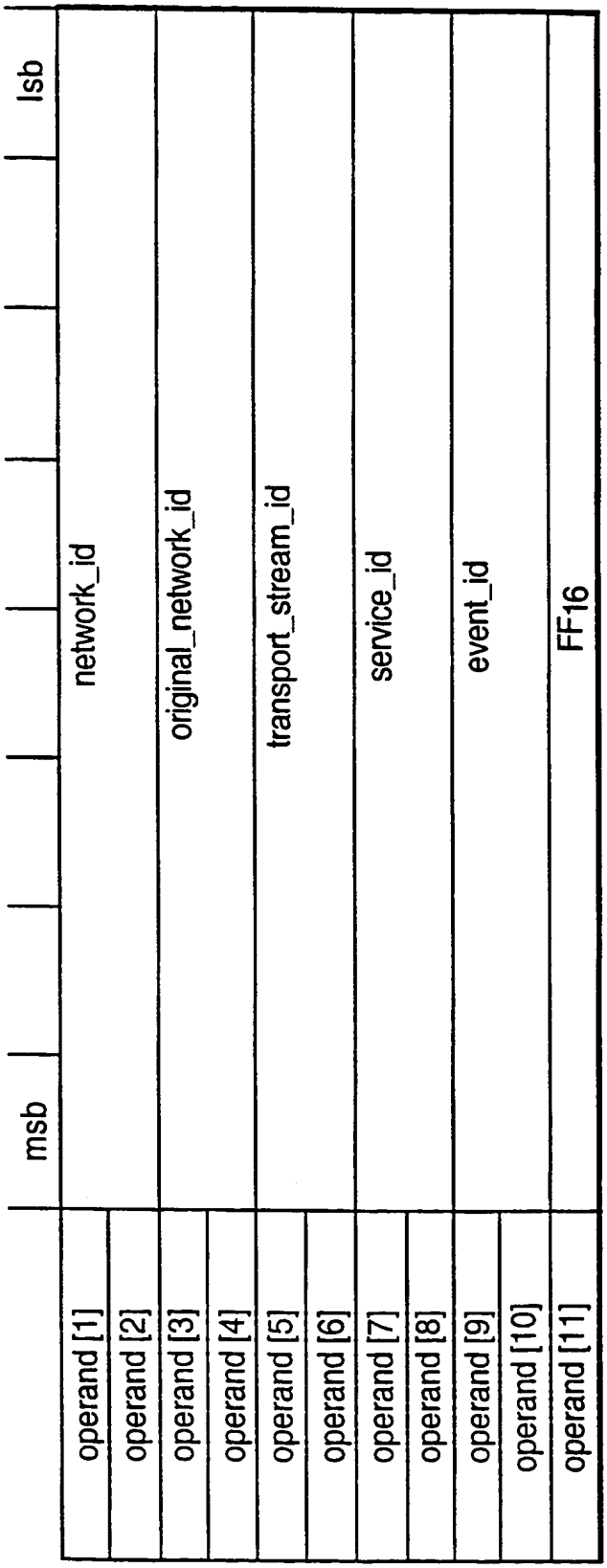


Fig.12(a).

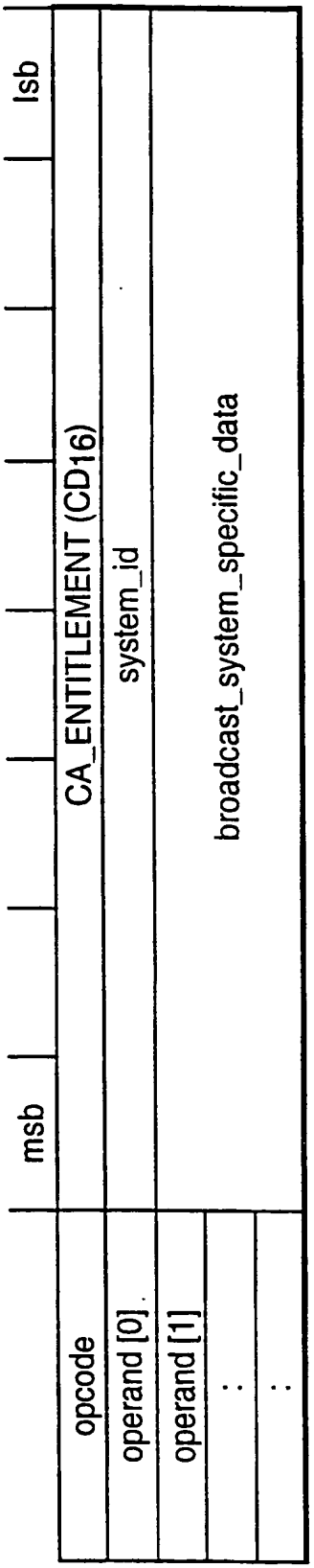


Fig.12(b).

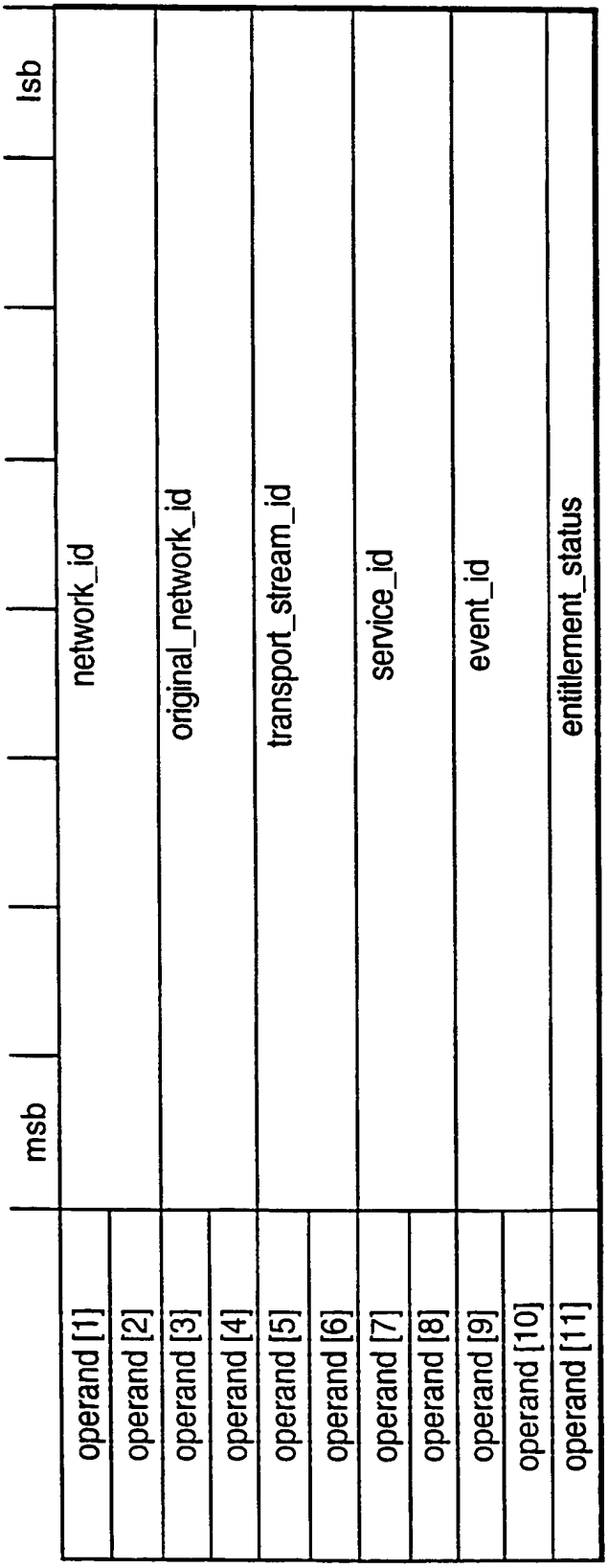


Fig.13.

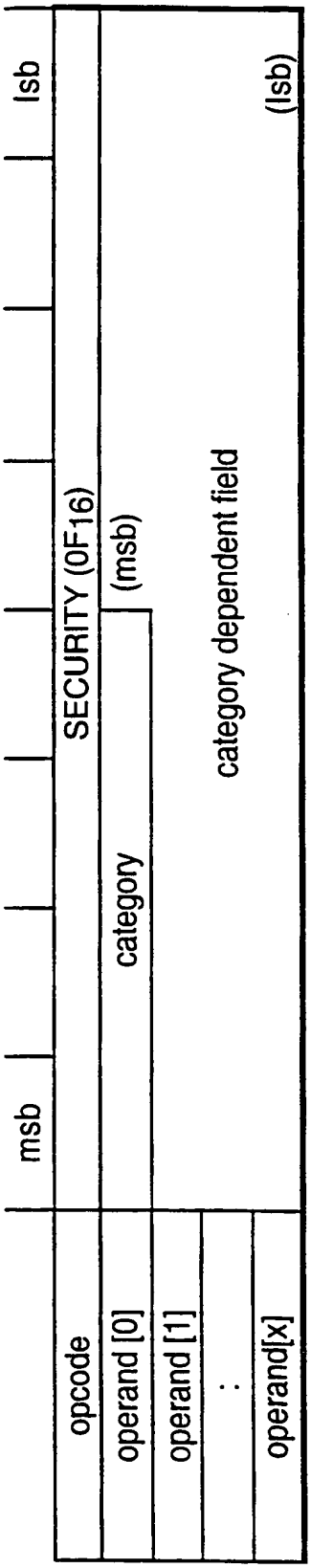

msb
lsb
SECURITY (0F16)
(msb)
category
category dependent field
(lsb)
opcode
operand [0]
operand [1]
operand[x]

Fig.15.

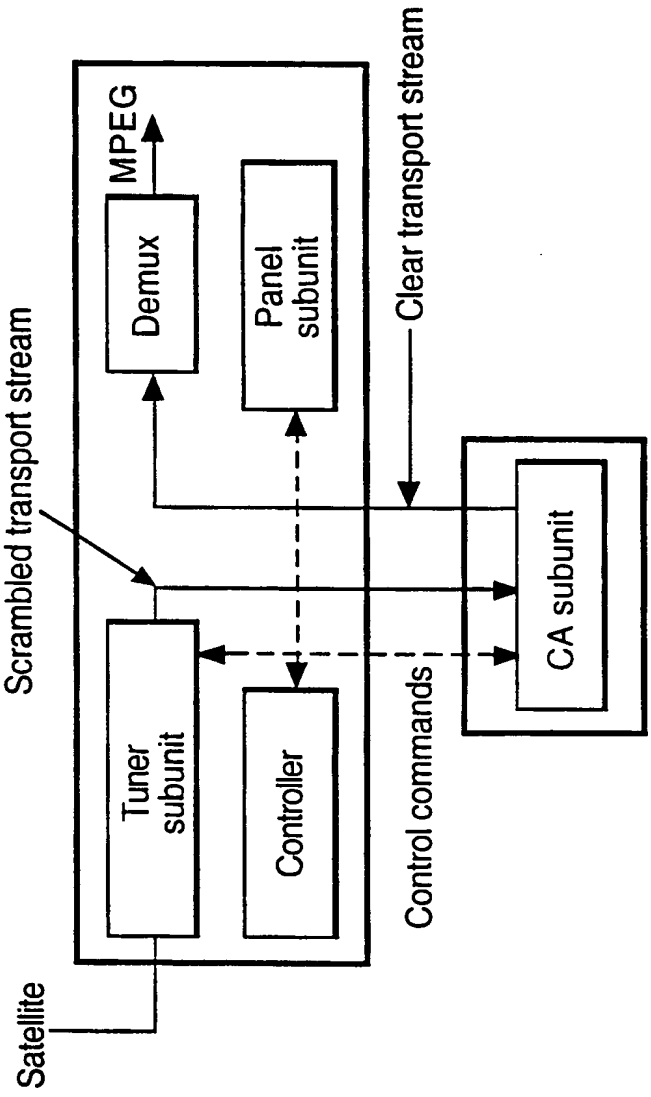
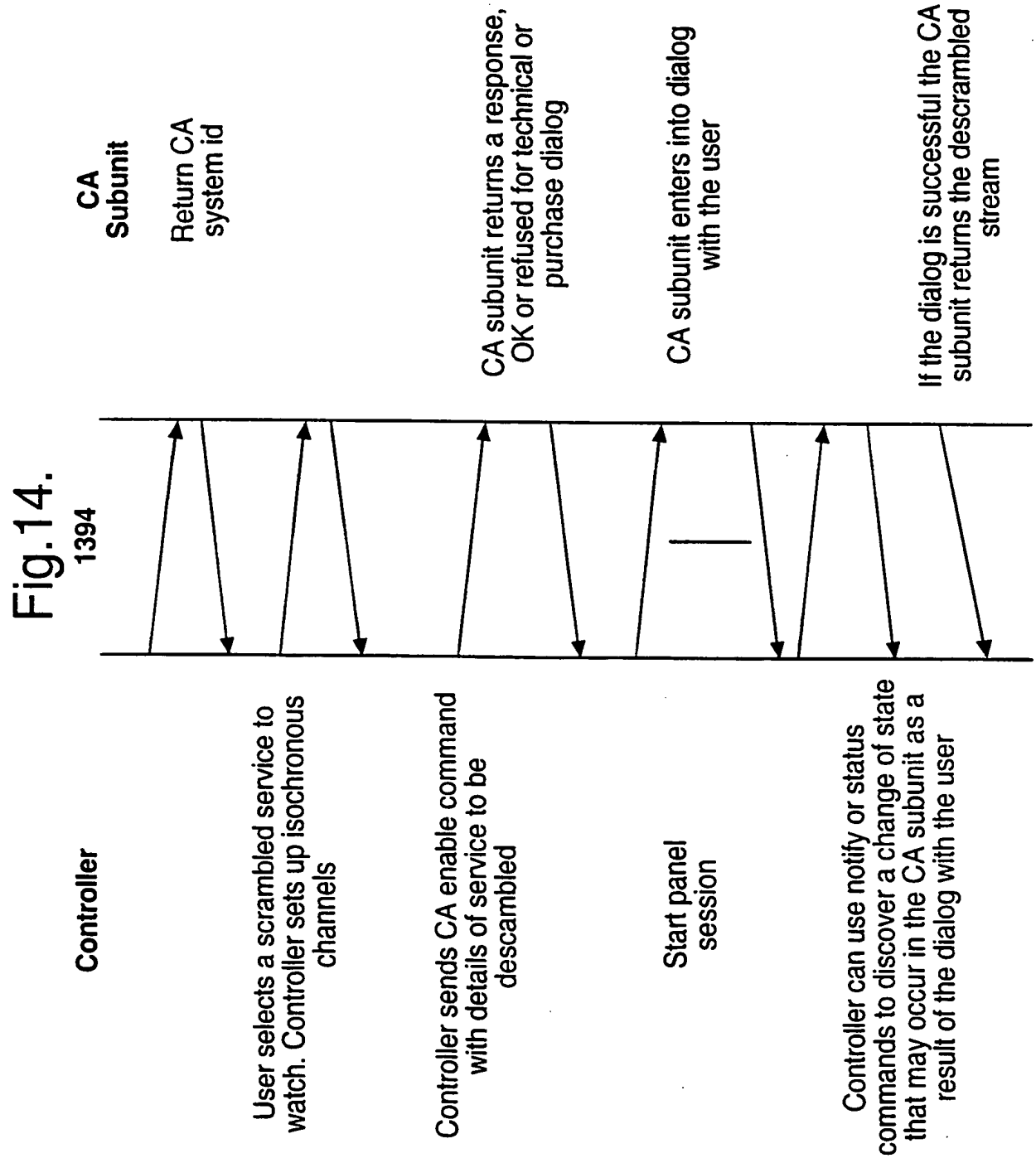

MPEG
Demux
Panel subunit
Clear transport stream
Scrambled transport stream
CA subunit
Tuner subunit
Controller
Control commands
Satellite

Fig.14.


1394
Controller
CA Subunit
Return CA system id
User selects a scrambled service to watch. Controller sets up isochronous channels
Controller sends CA enable command with details of service to be descambled
CA subunit returns a response, OK or refused for technical or purchase dialog
Start panel session
CA subunit enters into dialog with the user
Controller can use notify or status commands to discover a change of state that may occur in the CA subunit as a result of the dialog with the user
If the dialog is successful the CA subunit returns the descrambled stream

PCT

REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

International Application No.

International Filing Date

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference
(if desired) (12 characters maximum) N.74723A SLS

Box No. I TITLE OF INVENTION

NETWORKED CONDITIONAL ACCESS MODULE

Box No. II APPLICANT

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

SONY UNITED KINGDOM LIMITED
The Heights
Brooklands
Weybridge
SURREY
KT13 OXW
UNITED KINGDOM

☐ This person is also inventor.

Telephone No.

Facsimile No.

Teleprinter No.

State *(that is, country)* of nationality: GB

State *(that is, country)* of residence: GB

This person is applicant for the purposes of: ☒ all designated States ☐ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

BARRY, Richard John
19 St. Gabriels Lea
Chineham
Basingstoke
Hampshire
RG24 8RE
UNITED KINGDOM

This person is:

☐ applicant only

☒ applicant and inventor

☐ inventor only *(If this check-box is marked, do not fill in below.)*

State *(that is,country)* of nationality: GB

State *(that is, country)* of residence: GB

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

☐ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as: ☒ agent ☐ common representative

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

AYERS, Martyn Lewis Stanley
J.A. KEMP & CO.,
14 South Square,
Gray's Inn,
London, WC1R 5LX,
United Kingdom.

Telephone No.
+44 171 405 3292

Facsimile No.
+44 171 242 8932

Teleprinter No.
23676

☐ **Adress for correspondence:** Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Continuation of Box No. III FURTHER APPLICANTS AND/OR (FURTHER) INVENTORS

If none of the following sub-boxes is used, this sheet should not be included in the request.

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

PASKINS, Adrian Charles
14, Stratton Road
Cranbourne
Basingstoke
Hampshire
RG21 3NZ
UNITED KINGDOM

This person is:
- ☐ applicant only
- ☒ applicant and inventor
- ☐ inventor only *(If this check-box is marked, do not fill in below.)*

State *(that is, country)* of nationality: GB

State *(that is, country)* of residence: GB

This person is applicant for the purposes of:
- ☐ all designated States
- ☐ all designated States except the United States of America
- ☒ the United States of America only
- ☐ the States indicated in the Supplemental Box

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

This person is:
- ☐ applicant only
- ☐ applicant and inventor
- ☐ inventor only *(If this check-box is marked, do not fill in below.)*

State *(that is, country)* of nationality:

State *(that is, country)* of residence:

This person is applicant for the purposes of:
- ☐ all designated States
- ☐ all designated States except the United States of America
- ☐ the United States of America only
- ☐ the States indicated in the Supplemental Box

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

This person is:
- ☐ applicant only
- ☐ applicant and inventor
- ☐ inventor only *(If this check-box is marked, do not fill in below.)*

State *(that is, country)* of nationality:

State *(that is, country)* of residence:

This person is applicant for the purposes of:
- ☐ all designated States
- ☐ all designated States except the United States of America
- ☐ the United States of America only
- ☐ the States indicated in the Supplemental Box

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

This person is:
- ☐ applicant only
- ☐ applicant and inventor
- ☐ inventor only *(If this check-box is marked, do not fill in below.)*

State *(that is, country)* of nationality:

State *(that is, country)* of residence:

This person is applicant for the purposes of:
- ☐ all designated States
- ☐ all designated States except the United States of America
- ☐ the United States of America only
- ☐ the States indicated in the Supplemental Box

☐ Further applicants and/or (further) inventors are indicated on another continuation sheet.

Box No.V DESIGNATION OF STATES

The following designations are hereby made under Rule 4.9(a) *(mark the applicable check-boxes; at least one must be marked)*:

Regional Patent

- ☐ AP **ARIPO Patent:** GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, SD Sudan, SZ Swaziland, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT
- ☐ EA **Eurasian Patent:** AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ EP **European Patent:** AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☐ OA **OAPI Patent:** BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT *(if other kind of protection or treatment desired, specify on dotted line)* .....

National Patent *(if other kind of protection or treatment desired, specify on dotted line)*:

- ☐ AL Albania .....
- ☐ AM Armenia .....
- ☐ AT Austria .....
- ☐ AU Australia .....
- ☐ AZ Azerbaijan
- ☐ BA Bosnia and Herzegovina .....
- ☐ BB Barbados
- ☐ BG Bulgaria .....
- ☐ BR Brazil .....
- ☐ BY Belarus .....
- ☐ CA Canada
- ☐ CH and LI Switzerland and Liechtenstein
- ☒ CN China .....
- ☐ CU Cuba .....
- ☐ CZ Czech Republic .....
- ☐ DE Germany .....
- ☐ DK Denmark .....
- ☐ EE Estonia .....
- ☐ ES Spain .....
- ☐ FI Finland .....
- ☐ GB United Kingdom
- ☐ GD Grenada
- ☐ GE Georgia .....
- ☐ GH Ghana .....
- ☐ GM Gambia
- ☐ HR Croatia .....
- ☐ HU Hungary .....
- ☐ ID Indonesia
- ☐ IL Israel .....
- ☐ IN India .....
- ☐ IS Iceland
- ☒ JP Japan .....
- ☐ KE Kenya .....
- ☐ KG Kyrgyzstan .....
- ☐ KP Democratic People's Republic of Korea .....
- ☒ KR Republic of Korea .....
- ☐ KZ Kazakhstan .....
- ☐ LC Saint Lucia
- ☐ LK Sri Lanka
- ☐ LR Liberia
- ☐ LS Lesotho .....
- ☐ LT Lithuania
- ☐ LU Luxembourg
- ☐ LV Latvia
- ☐ MD Republic of Moldova .....
- ☐ MG Madagascar .....
- ☐ MK The former Yugoslav Republic of Macedonia .....
- ☐ MN Mongolia
- ☐ MW Malawi .....
- ☐ MX Mexico .....
- ☐ NO Norway
- ☐ NZ New Zealand .....
- ☐ PL Poland .....
- ☐ PT Portugal .....
- ☐ RO Romania
- ☐ RU Russian Federation .....
- ☐ SD Sudan
- ☐ SE Sweden
- ☐ SG Singapore
- ☐ SI Slovenia .....
- ☐ SK Slovakia .....
- ☐ SL Sierra Leone
- ☐ TJ Tajikistan .....
- ☐ TM Turkmenistan .....
- ☐ TR Turkey .....
- ☐ TT Trinidad and Tobago .....
- ☐ UA Ukraine .....
- ☐ UG Uganda .....
- ☒ US United States of America .....
- ☐ UZ Uzbekistan .....
- ☐ VN Viet Nam .....
- ☐ YU Yugoslavia .....
- ☐ ZW Zimbabwe .....

Check-boxes reserved for designating States (for the purposes of a national patent) which have become party to the PCT after issuance of this sheet:

- ☐ AE United Arab Emirates .....
- ☐ ZA South Africa .....
- ☐ .....

Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. *(Confirmation of a designation consists of the filing of a notice specifying that designation and the payment of the designation and confirmation fees. Confirmation must reach the receiving Office within the 15-month time limit.)*

Supplemental Box *If the Supplemental Box is not used, this sheet should not be included in the request.*

*1. If, in any of the Boxes, **the space is insufficient** to furnish all the information: in such case, write "Continuation of Box No. ..." [indicate the number of the Box] and furnish the information in the same manner as required according to the captions of the Box in which the space was insufficient, in particular:*

*(i) **if more than two persons are involved as applicants and/or inventors** and no "continuation sheet" is available: in such case, write "Continuation of Box No. III" and indicate for each additional person the same type of information as required in Box No. III. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below;*

*(ii) if, in Box No. II or in any of the sub-boxes of Box No. III, the indication **"the States indicated in the Supplemental Box"** is checked: in such case, write "Continuation of Box No. II" or "Continuation of Box No. III" or "Continuation of Boxes No. II and No. III" (as the case may be), indicate the name of the applicant(s) involved and, next to (each) such name, the State(s) (and/or, where applicable, ARIPO, Eurasian, European or OAPI patent) for the purposes of which the named person is applicant;*

*(iii) if, in Box No. II or in any of the sub-boxes of Box No. III, **the inventor or the inventor/applicant is not inventor for the purposes of all designated States or for the purposes of the United States of America**: in such case, write "Continuation of Box No. II" or "Continuation of Box No. III" or "Continuation of Boxes No. II and No. III" (as the case may be), indicate the name of the inventor(s) and, next to (each) such name, the State(s) (and/or, where applicable, ARIPO, Eurasian, European or OAPI patent) for the purposes of which the named person is inventor;*

*(iv) if, in addition to the agent(s) indicated in Box No. IV, there are **further agents**: in such case, write "Continuation of Box No. IV" and indicate for each further agent the same type of information as required in Box No. IV;*

*(v) if, in Box No. V, the name of any State (or OAPI) is accompanied by the indication **"patent of addition,"** or **"certificate of addition,"** or if, in Box No. V, the name of the United States of America is accompanied by an indication **"continuation"** or **"continuation-in-part"**: in such case, write "Continuation of Box No. V" and the name of each State involved (or OAPI), and after the name of each such State (or OAPI), the number of the parent title or parent application and the date of grant of the parent title or filing of the parent application;*

*(vi) if, in Box No. VI, there are **more than three earlier applications whose priority is claimed**: in such case, write "Continuation of Box No. VI" and indicate for each additional earlier application the same type of information as required in Box No. VI;*

*(vii) if, in Box No. VI, **the earlier application is an ARIPO application**: in such case, write "Continuation of Box No. VI", specify the number of the item corresponding to that earlier application and indicate at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed.*

*2. If, with regard to the **precautionary designation statement** contained in Box No. V, the applicant wishes to exclude any State(s) from the scope of that statement: in such case, write "Designation(s) excluded from precautionary designation statement" and indicate the name or two-letter code of each State so excluded.*

*3. If the applicant claims, in respect of any designated Office, the benefits of provisions of the national law concerning **non-prejudicial disclosures or exceptions to lack of novelty**: in such case, write "Statement concerning non-prejudicial disclosures or exceptions to lack of novelty" and furnish that statement below.*

CONTINUATION OF BOX NO IV

GOLDIN, Douglas Michael; ELLIS-JONES, Patrick George Armine; BARLOW, Roy James; SENIOR, Alan Murray; BENTHAM, Stephen; WOODS, Geoffrey Corlett; CRESSWELL, Thomas Anthony; SEXTON, Jane Helen; NICHOLLS, Michael John; MARSHALL Monica Anne; WEBB, Andrew John; KEEN, Celia Mary; PRICE, Nigel John King; IRVINE, Jonquil Claire; LEEMING, John Gerard; DUCKWORTH, Timothy John; MCCLUSKIE, Gail Wilson; WRIGHT, Simon Mark; CURWEN, Julian Charles Barton; CLEEVE, James Harold Findlay; SMITH, Samuel Leonard; BENSON, John Everett, CAMPBELL Patrick John; MERRYWEATHER, Colin Henry; DUCKETT, Anthony Joseph; BENTHAM, Andrew; and ROQUES, Sarah Elizabeth; SRINIVASAN, Ravi Chandran; FAULKNER, Charlotte Waveney and TYSON, Robin Edward of: J.A. KEMP & CO., 14 South Square, Gray's Inn, London, WC1R 5LX, United Kingdom.

Box No. VI PRIORITY CLAIM ☐ Further priority claims are indicated in the Supplemental Box.

Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is:		
		national application: country	regional application:* regional Office	international application: receiving Office
item (1) 6/5/1998	9809685.2	GB		
item (2)				
item (3)				

☒ The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) *(only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office)* identified above as item(s): _____

* *Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplemental Box at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See Supplemental Box.*

Box No. VII INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority (ISA) *(if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):*

ISA /

Request to use results of earlier search; reference to that search *(if an earlier search has been carried out by or requested from the International Searching Authority):*

Date *(day/month/year)* Number Country *(or regional Office)*

Box No. VIII CHECK LIST; LANGUAGE OF FILING

This international application contains the following **number of sheets:**

request	:
description (excluding sequence listing part)	: 27
claims	: 5
abstract	: 1
drawings	: 15
sequence listing part of description	:
Total number of sheets	: 48

This international application is **accompanied by** the item(s) marked below:

1. ☒ fee calculation sheet
2. ☐ separate signed power of attorney
3. ☐ copy of general power of attorney; reference number, if any:
4. ☐ statement explaining lack of signature
5. ☐ priority document(s) identified in Box No. VI as item(s):
6. ☐ translation of international application into (language):
7. ☐ separate indications concerning deposited microorganism or other biological material
8. ☐ nucleotide and/or amino acid sequence listing in computer readable form
9. ☐ other *(specify)*:

Figure of the drawings which should accompany the abstract:

Language of filing of the international application:

Box No. IX SIGNATURE OF APPLICANT OR AGENT

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).

SMITH, Samuel Leonard
AUTHORISED REPRESENTATIVE

For receiving Office use only

1. Date of actual receipt of the purported international application:
2. Drawings: ☐ received: ☐ not received:
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:
4. Date of timely receipt of the required corrections under PCT Article 11(2):
5. International Searching Authority (if two or more are competent): ISA /
6. ☐ Transmittal of search copy delayed until search fee is paid.

For International Bureau use only

Date of receipt of the record copy by the International Bureau:

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	**FOR FURTHER ACTION**	see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.
N.74723A SLS		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/GB 99/01392	05/05/1999	06/05/1998
Applicant		
SONY UNITED KINGDOM LIMITED et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 2 sheets.

[X] It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

a. With regard to the **language,** the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

[ ] the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

[ ] contained in the international application in written form.

[ ] filed together with the international application in computer readable form.

[ ] furnished subsequently to this Authority in written form.

[ ] furnished subsequently to this Authority in computer readble form.

[ ] the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

[ ] the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. [ ] **Certain claims were found unsearchable** (See Box I).

3. [ ] **Unity of invention is lacking** (see Box II).

4. With regard to the **title,**

[X] the text is approved as submitted by the applicant.

[ ] the text has been established by this Authority to read as follows:

5. With regard to the **abstract,**

[X] the text is approved as submitted by the applicant.

[ ] the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No. 2

[ ] as suggested by the applicant.

[X] because the applicant failed to suggest a figure.

[ ] because this figure better characterizes the invention.

[ ] None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No
[redacted]/GB 99/01392

*A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H04L12/64 H04N5/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 H04L H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	I OKOTH ET AL: "DVB: Common Interface als ideale interaktive Multimedia-Umgebung" FERNSEH UND KINOTECHNIK, vol. 51, no. 12, 1 January 1997 (1997-01-01), pages 854-856, XP002088534 ISSN: 0015-0142 page 854, right-hand column, line 1 - line 17 page 856, middle column, line 28 - line 42 ---	1-3,25, 26
A	US 5 590 202 A (BESTLER CAITLIN B ET AL) 31 December 1996 (1996-12-31) the whole document -----	1-3,25, 26

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
22 September 1999	04/10/1999

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Perez Perez, J

1

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
GB 99/01392

* Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5590202 A	31-12-1996	CA 2167222 A	19-07-1996
		US 5680457 A	21-10-1997

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT OR THE DECLARATION

(PCT Rule 44.1)

To:
J.A. KEMP & CO.
Attn. AYERS, M.L.S.
14 South Square
Gray's Inn
London WC1R 5LX
UNITED KINGDOM

J A KEMP & Co
RECD - 7 OCT 1999
Answer by.....

Date of mailing *(day/month/year)*	04/10/1999
Applicant's or agent's file reference: N.74723A SLS	**FOR FURTHER ACTION** See paragraphs 1 and 4 below
International application No.: PCT/GB 99/01392	International filing date *(day/month/year)* 05/05/1999
Applicant: SONY UNITED KINGDOM LIMITED et al.	

1. [X] The applicant is hereby notified that the International Search Report has been established and is transmitted herewith.

Filing of amendments and statement under Article 19:
The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

When? The time limit for filing such amendments is normally 2 months from the date of transmittal of the International Search Report; however, for more details, see the notes on the accompanying sheet.

Where? Directly to the International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland
Fascimile No.: (41-22) 740.14.35

For more detailed instructions, see the notes on the accompanying sheet.

2. [ ] The applicant is hereby notified that no International Search Report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.

3. [ ] **With regard to the protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

[ ] the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

[ ] no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Further action(s):** The applicant is reminded of the following:

Shortly after **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90*bis*.1 and 90*bis*.3, respectively, before the completion of the technical preparations for international publication.

Within **19 months** from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later).

Within **20 months** from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 19 months from the priority date or could not be elected because they are not bound by Chapter II.

Name and mailing address of the International Searching Authority	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Theresia Van Deursen

Form PCT/ISA/220 (July 1998)

NOTES TO FORM PCT/ISA/220

These Notes are intended to give the basic instructions concerning the filing of amendments under article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the PCT Applicant's Guide, a publication of WIPO.

In these Notes, "Article", "Rule", and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions respectively.

INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international pbulication. Furthermore, it should be emphasized that provisional protection is available in some States only.

What parts of the international application may be amended?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

When?

Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

Where not to file the amendments?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

How?

Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Section 205(b)).

The amendments must be made in the language in which the international application is to be published.

What documents must/may accompany the amendments?

Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped),whether

(i) the claim is unchanged;

(ii) the claim is cancelled;

(iii) the claim is new;

(iv) the claim replaces one or more claims as filed;

(v) the claim is the result of the division of a claim as filed.

The following examples illustrate the manner in which amendments must be explained in the accompanying letter:

1. [Where originally there were 48 claims and after amendment of some claims there are 51]:
"Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended claims bearing the same numbers; claims 30, 33 and 36 unchanged; new claims 49 to 51 added."

2. [Where originally there were 15 claims and after amendment of all claims there are 11]:
"Claims 1 to 15 replaced by amended claims 1 to 11."

3. [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]:
"Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." or
"Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."

4. [Where various kinds of amendments are made]:
"Claims 1-10 unchanged; claims 11 to 13, 18 and 19 cancelled; claims 14, 15 and 16 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

"Statement under article 19(1)" (Rule 46.4)

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).

The statement will be published with the international application and the amended claims.

It must be in the language in which the international appplication is to be published.

It must be brief, not exceeding 500 words if in English or if translated into English.

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be identified as such by a heading, preferably by using the words "Statement under Article 19(1)."

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. Reference to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim.

Consequence if a demand for international preliminary examination has already been filed

If, at the time of filing any amendments under Article 19, a demand for international preliminary examination has already been submitted, the applicant must preferably, at the same time of filing the amendments with the International Bureau, also file a copy of such amendments with the International Preliminary Examining Authority (see Rule 62.2(a), first sentence).

Consequence with regard to translation of the international application for entry into the national phase

The applicant's attention is drawn to the fact that, where upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/elected Offices, instead of, or in addition to, the translation of the claims as filed.

For further details on the requirements of each designated/elected Office, see Volume II of the PCT Applicant's Guide.

PA NT COOPERATION TREAT

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

To:

Assistant Commissioner for Patents
United States Patent and Trademark Office
Box PCT
Washington, D.C.20231
ÉTATS-UNIS D'AMÉRIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 13 December 1999 (13.12.99)	
International application No. PCT/GB99/01392	**Applicant's or agent's file reference** N.74723A SLS
International filing date (day/month/year) 05 May 1999 (05.05.99)	**Priority date** (day/month/year) 06 May 1998 (06.05.98)
Applicant BARRY, Richard, John et al	

1. The designated Office is hereby notified of its election made:

[X] in the demand filed with the International Preliminary Examining Authority on:

18 November 1999 (18.11.99)

[ ] in a notice effecting later election filed with the International Bureau on:

2. The election [X] was

[ ] was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO **34, chemin des Colombettes** **1211 Geneva 20, Switzerland**	Authorized officer Jean-Marc Vivet
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

e demand must be filed directly with the competent International Preliminary Examining Authority or, if two or more Authorities are competent, ith the one chosen by the applicant. The full name or two-letter code of that Authority may be indicated by the applicant on the line below:

IPEA/ EP

PCT

CHAPTER II

DEMAND

under Article 31 of the Patent Cooperation Treaty:
The undersigned requests that the international application specified below be the subject of international preliminary examination according to the Patent Cooperation Treaty and hereby elects all eligible States (except where otherwise indicated).

For International Preliminary Examining Authority use only

Identification of IPEA	Date of receipt of DEMAND

Box No. I IDENTIFICATION OF THE INTERNATIONAL APPLICATION

Applicant's or agent's file reference: N.74723A SLS

International application No.	International filing date *(day/month/year)*	(Earliest) Priority date *(day/month/year)*
PCT/GB99/01392	5 May 1999	6 May 1998

Title of invention: NETWORKED CONDITIONAL ACCESS MODULE

Box No. II APPLICANT(S)

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

SONY UNITED KINGDOM LIMITED
The Heights
Brooklands
Weybridge
Surrey KT13 0XW
United Kingdom

Telephone No.:

Facsimile No.:

Teleprinter No.:

State *(that is, country)* of nationality:	State *(that is, country)* of residence:
GB	GB

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

BARRY, Richard, John
19 St. Gabriels Lea
Chineham
Basingstoke
Hampshire RG24 8RE
United Kingdom

State *(that is, country)* of nationality:	State *(that is, country)* of residence:
GB	GB

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

PASKINS, Adrian, Charles
14 Stratton Road
Cranbourne
Basingstoke
Hampshire RG21 3NZ
United Kingdom

State *(that is, country)* of nationality:	State *(that is, country)* of residence:
GB	GB

☐ Further applicants are indicated on a continuation sheet.

International application No.
PCT/GB99/01392

Box No. III AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The following person is [X] agent [ ] common representative

and [X] has been appointed earlier and represents the applicant(s) also for international preliminary examination.

[ ] is hereby appointed and any earlier appointment of (an) agent(s)/common representative is hereby revoked.

[ ] is hereby appointed, specifically for the procedure before the International Preliminary Examining Authority, in addition to the agent(s)/common representative appointed earlier.

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

SMITH, SAMUEL LEONARD
J.A. KEMP & CO.,
14 South Square,
London, WC1R 5LX,
United Kingdom.

Telephone No.: +44 171 405 3292

Facsimile No.: +44 171 242 8932

Teleprinter No.: 23676

[ ] **Address for correspondence:** Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Box No. IV BASIS FOR INTERNATIONAL PRELIMINARY EXAMINATION

Statement concerning amendments:*

1. The applicant wishes the international preliminary examination **to start on the basis of:**

[X] the international application as originally filed

the description
[ ] as originally filed
[ ] as amended under Article 34

the claims
[ ] as originally filed
[ ] as amended under Article 19 (together with any accompanying statement)
[ ] as amended under Article 34

the drawings
[ ] as originally filed
[ ] as amended under Article 34

2. [ ] The applicant wishes any amendment to the claims under Article 19 to be considered as reversed.

3. [ ] The applicant wishes the start of the international preliminary examination **to be postponed** until the expiration of 20 months from the priority date unless the International Preliminary Examining Authority receives a copy of any amendments made under Article 19 or a notice from the applicant that he does not wish to make such amendments (Rule 69.1(d)). *(This check-box may be marked only where the time limit under Article 19 has not yet expired.)*

* Where no check-box is marked, international preliminary examination will start on the basis of the international application as originally filed or, where a copy of amendments to the claims under Article 19 and/or amendments of the international application under Article 34 are received by the International Preliminary Examining Authority before it has begun to draw up a written opinion or the international preliminary examination report, as so amended.

Language for the purposes of international preliminary examination: English

[X] which is the language in which the international application was filed.
[ ] which is the language of a translation furnished for the purposes of international search.
[ ] which is the language of publication of the international application.
[ ] which is the language of the translation (to be) furnished for the purposes of international preliminary examination.

Box No. V ELECTION OF STATES

The applicant hereby **elects all eligible States** *(that is, all States which have been designated and which are bound by Chapter II of the PCT)*

excluding the following States which the applicant wishes **not to elect:**

See Notes to the demand form

International application No.
PCT/GB99/01392

Box No. VI CHECK LIST

The demand is accompanied by the following elements, in the language referred to in Box No. IV, for the purposes of international preliminary examination:

			For International Preliminary Examining Authority use only	
			received	not received
1. translation of international application	:	sheets	☐	☐
2. amendments under Article 34	:	sheets	☐	☐
3. copy (or, where required, translation) of amendments under Article 19	:	sheets	☐	☐
4. copy (or, where required, translation) of statement under Article 19	:	sheets	☐	☐
5. letter	: 1	sheets	☐	☐
6. other *(specify)*	:	sheets	☐	☐

The demand is also accompanied by the item(s) marked below:

1. ☒ fee calculation sheet
2. ☐ separate signed power of attorney
3. ☐ copy of general power of attorney; reference number, if any:
4. ☐ statement explaining lack of signature
5. ☐ nucleotide and or amino acid sequence listing in computer readable form
6. ☐ other *(specify)*:

Box No. VII SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the demand).

BARLOW, ROY JAMES

For International Preliminary Examining Authority use only

1. Date of actual receipt of DEMAND:
2. Adjusted date of receipt of demand due to CORRECTIONS under Rule 60.1(b):
3. ☐ The date of receipt of the demand is AFTER the expiration of 19 months from the priority date and item 4 or 5, below, does not apply. ☐ The applicant has been informed accordingly.
4. ☐ The date of receipt of the demand is WITHIN the period of 19 months from the priority date as extended by virtue of Rule 80.5.
5. ☐ Although the date of receipt of the demand is after the expiration of 19 months from the priority date, the delay in arrival is EXCUSED pursuant to Rule 82.

For International Bureau use only

Demand received from IPEA on:

CHAPTER II

PCT

FEE CALCULATION SHEET

Annex to the Demand for international preliminary examination

International application No.	PCT/GB99/01392
Applicant's or agent's file reference	N.74723A SLS

For International Preliminary Examining Authority use only

Date stamp of the IPEA

Applicant

SONY UNITED KINGDOM LIMITED

Calculation of prescribed fees

1. Preliminary examination fee	EUR 1533	P
2. Handling fee *(Applicants from certain States are entitled to a reduction of 75% of the handling fee. Where the applicant is (or all applicants are) so entitled, the amount to be entered at H is 25% of the handling fee.)*	EUR 148	H
3. Total of prescribed fees Add the amounts entered at P and H and enter total in the TOTAL box	EUR 1681	TOTAL

Mode of Payment

[X]	authorization to charge deposit account with the IPEA (see below)	[ ]	cash
[ ]	cheque	[ ]	revenue stamps
[ ]	postal money order	[ ]	coupons
[ ]	bank draft	[ ]	other *(specify)*:

Deposit Account Authorization *(this mode of payment may not be available at all IPEAs)*

The IPEA/ EP [X] is hereby authorized to charge the total fees indicated above to my deposit account.

[X] *(this check-box may be marked only if the conditions for deposit accounts of the IPEA so permit)* is hereby authorized to charge any deficiency or credit any overpayment in the total fees indicated above to my deposit account.

2805.0038	17 November 1999	BARLOW, ROY JAMES
Deposit Account Number	Date *(day/month/year)*	Signature

See Notes to the fee calculation sheet

PATENT COOPERATION TREATY

Fax No: 44-171-242-8932

From the
INTERNATIONAL PRELIMINARY EXAMINATION AUTHORITY

To:

SMITH, Samuel L.
J.A. KEMP & CO.
14 South Square
Gray's Inn
London WC1R 5LX
GRANDE BRETAGNE

J. A. KEMP & Co
REC'D - 1 MAR 2000
Action by.....

PCT – 6 pages –

Confirmation
FAX-Bestätigung

INVITATION TO RESTRICT OR TO PAY ADDITIONAL FEES

(PCT Article 34(3) (a) and Rule 68.2)

Date of mailing *(Day/month/year)*	(Fax 23.02.2000) 25.02.00
Applicant's or agent's file reference: N.74723A SLS	**REPLY OR PAYMENT DUE** within 1 month(s) from the above date of mailing

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/GB99/01392	05/05/1999	06/05/1998

International Patent classification (IPC) or national Patent classification:
H04L12/64

Applicant
SONY UNITED KINGDOM LIMITED et al.

1. This International Examining Authority

   (i) considers that **the international application does not comply with the requirements of unity of invention** (Rule 13.1, 13.2 and 13.3) for the reasons indicated in the Annex.

   (ii) therefore considers that there are **3 inventions** claimed in the international application as indicated in the Annex.

   (iii) recalls that claims relating to inventions in respect of which no international search report has been established need not be the subject of international preliminary examination (Rule 66.1 (e)).

2. Consequently the applicant is hereby **invited**, within the time limit indicated above, **to restrict the claims** as suggested under item 3, below, **or to pay** the amount indicated below:

EUR 1.533,–	x	2	=	EUR 3.066,–
Fee per additional invention		number of additional inventions		total amount of additional fees

   The applicant is informed that, according to Rule 68.3 (c), **the payment of any additional fee may be made under protest**, i.e. a reasonned statement to the effect that the international application complies with the requirement of unity of invention or that the amount of the required additional fee is excessive.

3. **If the applicant opts to restrict the claims**, this Authority suggests the restriction possibilities indicated in the Annex, which in its opinion would be in compliance with the requirement of unity of invention.

4. **In the absence of any response** from the applicant, this Authority will establish the international preliminary examination report on those parts of the international application indicated in the Annex which, in the opinion of this Authority appear to relate to the main invention.

Name and mailing adress of the international preliminary examination authority:
European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523656 epmu d
Fax: +49 89 2399 - 4465

Authorized officer
Huber, O

Telephone No. +49 89 2399-8967

INVITATION TO RESTRICT OR TO PAY ADDITIONAL FEES

International application No. PCT/GB99/01392

The examination is being carried out on the **following application documents**:

Text for the Contracting States:
AT BE CH DE DK ES FI FR GB GR IT IE LI LU MC NL PT SE

Description, pages:

1-27 as originally filed

Claims, No.:

1-28 as originally filed

Drawings, sheets:

1/15-15/15 as originally filed

1. The Applicant is advised that all independent claims must be linked by a single inventive concept (Rule 13.1 PCT). In the present case however, this requirement is not met. There are **three separate inventions** or groups of inventions, as follows:

   I) A conditional access **subunit** (**Claim 1**) with corresponding **reciprocal subunit** (**Claim 2**), corresponding **method** defining a Conditional Access Module as a Conditional Access Subunit (**Claim 3**) and a corresponding **tuner** (**Claim 28**) comprising such a subunit, which comprises means to exchange AV/C Conditional Access Commands and replies over an IEEE 1394 network.

   II) A conditional access **subunit** (**Claim 25**) which descrambles a transport stream, scrambles the stream again before retransmitting such that only authorized subunits can descramble the scream.

   III) A conditional access **subunit** (**Claim 26**) which periodically contacts a tuner to request a transport stream for a period of time, which is long enough to update the entitlement management messages. Additionally a **network** (**Claim 27**) and a **tuner** (**Claim 28**) comprising such a subunit correspond thereto.

These **three** inventions **could be implemented independently** of each other and share neither an inventive concept (Rule 13.1 PCT), nor special technical features or method steps (Rule 13.2 PCT) for the following reason:

The inventions do not share any technical features beside the fact that they are used "for connection to an IEEE 1394 network" which is not a limiting feature ("for" is interpreted as "suitable for ...").

In view of the above, the Applicant may wish to **restrict the claims**. As all claims have been searched, as if they were restricted to those dealing with any single one of the above identified inventions, they would then comply with the requirements of unity of invention.

Alternatively, as a full preliminary search report has been established, a full preliminary examination may also be conducted, providing that additional preliminary examination fees are paid (See form 405) (Article 34(3)(a), Rule 68(2)PCT).

In the present case, in order to overcome this objection, it would appear appropriate to file an amended set of claims defining the relevant subject-matter in terms of a minimum number of independent claims in each category (one for a "conditional access subunit", one for a "network including a conditional access subunit", one for a "tuner having embedded a conditional access subunit" and a corresponding "method for operating a conditional access subunit") followed by dependent claims covering features which are merely optional (Rule 6.4 PCT).

In filling a new set of claims, the Applicant is asked to point out specifically how the requirements of Rules 13.1 and 13.2 PCT are fulfilled, should more than one independent claim be filed. Furthermore, the support by the description (Art. 6 PCT) should be demonstrated in order to avoid an objection based on Art. 34 (2)(b) PCT (extension beyond the content of the application as filed).

If the Applicant does **not respond to the invitation** to restrict the claims or pay additional fees, the preliminary examination **report will be established on** those parts of the international application appearing to be the main invention, namely **invention I** (Article 34(3)(c) PCT).

2. It is not considered appropriate at this stage to analyse in detail all the separate independent claims, since in the view of the following comments, the **number of independent claims** will in any case have to be **reduced**.

   Due to the multiplicity of independent claims broadly defining **three different systems** with corresponding methods (see above) by six independent claims having all different wording, it is totally unclear for which subject-matter protection is really sought. Therefore the requirements of Article 6 PCT are not met.

   It is **not possible to form an opinion** on the novelty, inventiveness and industrial applicability of the subject-matter of the claims until a set of claims is filed clearly **relating to a single invention**, including a reasonable number of independent claims which define all the essential features of the invention (cf. PCT Guidelines, Chapter III, 4.4).

3. Taking the application as a whole into consideration, tho following comments can further be given:

   a. The designation of the subject matter "a subunit" (**Claim 2**) is not sufficiently clear (Article 6 PCT) to distinguish it from the "conditional access subunit" in Claim 1.

   b. The designation of the subject matter "A method of providing a Conditional Access Module" (**Claim 3**) leaves doubt about the category of the claim (see PCT-Gazette, Section IV, III-4.1). Furthermore, Claim 3 does not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined. The claim attempts to define the subject-matter in terms of the result to be achieved which merely amounts to a statement of the underlying problem. The technical features necessary for achieving this result should be added.

   c. **Claims 8 and 10** include features in brackets: "(purchase dialogue)", "(technical dialogue)", which does not allow to interpret these as part of the Claim, but to be only a support for analysing the figures.

d. The independent Claims are not in the two-part form in accordance with Rule 6.3(b) PCT, which in the present case would be appropriate, with those features known in combination from the prior art document **D1** = I OKOTH ET AL: 'DVB: Common Interface als ideale interaktive Multimedia-Umgebung' FERNSEH UND KINOTECHNIK, vol. 51, no. 12, 1 January 1997 (1997-01-01), pages 854-856, XP002088534 ISSN: 0015-0142, being placed in a preamble (Rule 6.3(b)(i) PCT) and with the remaining features being included in a characterising part (Rule 6.3(b)(ii) PCT).

The independent Claims should therefore be redrafted accordingly. If, however, the applicant is of the opinion that the two-part form would be inappropriate, then reasons therefor should be provided in the letter of reply. In addition, the applicant should ensure that it is clear from the description which features of the subject-matter of the independent Claims are **known from** document **D1** (see the PCT Guidelines PCT/GL/3 III, 2.3a).

e. Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents **D1 and D2** = US-A-5 590 202 (BESTLER CAITLIN B ET AL) 31 December 1996 (1996-12-31) is not mentioned in the description, nor are these documents identified therein.

f. The description is should be in conformity with the claims as required by Rule 5.1(a)(iii) PCT. In particular the objective techical problem of the state of the art D1, solved by the characterizing part of the application, should be pointed out.

4. In view of the above objections, the Applicant should present any amended claim in such a form that unambiguously a technical system or method including all the features being essential for the whole exploitation of the invention is claimed, respecting the requirements of unity (Rule 13 PCT).

EPA/EPO/OEB
D-80298 München
+49 89 2399-0
TX 523 656 epmu d
FAX +49 89 2399-4465

Correspondence with the EPO on PCT Chapter II demands

In order to ensure that your PCT Chapter II demand is dealt with as promptly as possible you are requested to use the enclosed self-adhesive labels with any correspondence relating to the demand sent to the Munich Office.

One of these labels should be affixed to a prominent place in the upper part of the letter or form etc. which you are filing.

PATENT COOPERATION TREATY

Fax No: 44-171-242-8933

From the:
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:
SMITH, Samuel L.
J.A. KEMP & CO.
14 South Square
Gray's Inn
London WC1R 5LX
GRANDE BRETAGNE

J.A. KEMP & Co
RECD 26 MAY 2000
Actio SLS - AA

PCT

— 9 pages —

WRITTEN OPINION

(PCT Rule 66)

(sent in advance)

Date of mailing *(day/month/year)*	22.05.2000
Applicant's or agent's file reference: N.74723A SLS	**REPLY DUE** **within 2 month(s)** from the above date of mailing

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/GB99/01392	05/05/1999	06/05/1998

International Patent Classification (IPC) or both national classification and IPC
H04L12/64

Applicant
SONY UNITED KINGDOM LIMITED et al.

1. This written opinion is the **first** drawn up by this International Preliminary Examining Authority.

2. This opinion contains indications relating to the following items:

I	☒	Basis of the opinion
II	☐	Priority
III	☐	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
IV	☒	Lack of unity of invention
V	☒	Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
VI	☐	Certain document cited
VII	☒	Certain defects in the international application
VIII	☒	Certain observations on the international application

3. The applicant is hereby **invited to reply** to this opinion.

When? See the time limit indicated above. The applicant may, before the expiration of that time limit, request this Authority to grant an extension, see Rule 66.2(d).

How? By submitting a written reply, accompanied, where appropriate, by amendments, according to Rule 66.3. For the form and the language of the amendments, see Rules 66.8 and 66.9.

Also: For an additional opportunity to submit amendments, see Rule 66.4. For the examiner's obligation to consider amendments and/or arguments, see Rule 66.4 bis. For an informal communication with the examiner, see Rule 66.6.

If no reply is filed, the international preliminary examination report will be established on the basis of this opinion.

4. The final date by which the international preliminary examination report must be established according to Rule 69.2 is: 06/09/2000.

Name and mailing address of the international preliminary examining authority:
European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523656 epmu d
Fax: +49 89 2399 - 4465

Authorized officer / Examiner
Huber, O

Formalities officer (incl. extension of time limits)
Ahrens, R
Telephone No. +49 89 2399 8136

I. Basis of the opinion

1. This opinion has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed".)*:

Description, pages:

1-27 as originally filed

Claims, No.:

1-28 as originally filed

Drawings, sheets:

1/15-15/15 as originally filed

2. The amendments have resulted in the cancellation of:

☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

3. This opinion has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

IV. Lack of unity of invention

1. In response to the invitation (Form PCT/IPEA/405) to restrict or pay additional fees, the applicant has:

☐ restricted the claims.

☐ paid additional fees.

☐ paid additional fees under protest.

☒ neither restricted nor paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied with for the following reasons

and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees:

3. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this opinion:

☐ all parts.

☒ the parts relating to claims Nos. 1-24,28.

V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-24, 28
Inventive step (IS)	Claims	
Industrial applicability (IA)	Claims	

2. Citations and explanations

see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item V

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Reference is made to the following documents:

   D1 = I OKOTH ET AL: 'DVB: Common Interface als ideale interaktive Multimedia-Umgebung' FERNSEH UND KINOTECHNIK, vol. 51, no. 12, 1 January 1997 (1997-01-01), pages 854-856, XP002088534 ISSN: 0015-0142

   D2 = US-A-5 590 202 (BESTLER CAITLIN B ET AL) 31 December 1996 (1996-12-31)

2. As far as Claim 1 could be understood (see Item VIII), the subject-matter of **Claim 1** of the present application **cannot be considered as novel** (Article 33(2) PCT) for the following reason:

   Document **D1**, which is considered to represent the most relevant state of the art, **discloses** (according to the wording of present claim) **all features of Claim 1**, a conditional access (page 854, middle column, line 11: "*Conditional Access Module*") subunit (see Bild 3, the "Common Interface" separates the receiver from the descrambler; also Bild 4 shows the common interface) for connection to an IEEE 1394 network (page 856, 3. paragraph: "*Die Common-Interface-Spezifikation von DVB erlaubt den Anschluß von bis zu acht CI-Modulen ...*"), which comprises;
   means to receive AV/C Conditional Access Commands over the IEEE network from another subunit (page 854, right column, lines 5-8: "*Das Common Interface ist ein Bindeglied zwischen den nach DVB vereinheitlichten Komponenten ...*" and the standard comprises already the AV/C commands, see the description page 2, lines 9-14); and
   means to transmit AV/C responses over the IEEE 1394 network in response to the received AV/C Conditional Access Commands (the reply response scheme of the AV/C commands is part of the technical standard and as thus acknowledged in the description: page 26, lines 8-10: "*Due to the nature of AV/C commands whereby each command requires a response ...*").

Furthermore, it should be noted that even if novelty of Claim 1 could be argued, based on minor differences between the features of Claim 1 and those disclosed in D1, the subject-matter of Claim 1 would not involve an inventive step, Articles 33 (3) PCT, in view of the disclosure of D1, especially as this document discloses the same object and the same type of solution as claimed in Claim 1, i.e. a subunit connected via a common interface (IEEE 1394).

Present Claim 1 is therefore not considered as novel.

3. Independent **Claims 2,3 and 28 correspond for** the category "use", "method" and "tuner (system)" to the method claimed in **Claim 1**. Therefore the same objections arise regarding novelty as for Claim 1 (see paragraph 2.).

4. Dependent **Claims 4-24 do not contain** any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of **novelty**, the reasons being as follows:

The person skilled in the art is aware of the different commands to operate the Conditional Access Module, like the CA enable command (Claim 4) an op code like CC_{16} (Claim 5), a system ID (Claim 6), an action operand (Claim 7), an CA enable and notify command (Claim 9), a service ID (Claim 11), an operand for the number of PID definition to follow (Claim 12), a stream type operand (Claim 13), a CA entitlement command (Claim 14) with opcode CD_{16} (Claim 15) which includes a system ID (Claim 16) or defining broadcast systems (Claim 17), including various IDs (Claim 18), an operand able to represent entitlement status (Claim 19) with various values (Claim 20), a security command (Claim 21)with opcode $0F_{16}$ (Claim 22), the security command includes authentication (Claim 23), which are defined in the IEC61883 standard according to the description (page 2, lines 15-24).

These functions are also well known from document D2 which serve for the same purpose in a similar conditional access module.

Document **D1 further discloses**:

a. A descrambling facility within the subunit (**Claim 8 and 10**) is shown in Bild 3: "Descrambler" in CAM (Conditional Access Module).

b. The subunit only transmits data after authentication (**Claim 24**) is disclosed by the "Smart Card Interface" in Bild 3.

Therefore the subject-matter of **Claims 2-24 is not considered as novel.**

Re Item VII

Certain defects in the international application

1. The independent Claims are not in the two-part form in accordance with Rule 6.3(b) PCT, which in the present case would be appropriate, with those features known in combination from the prior art document **D1**, being placed in a preamble (Rule 6.3(b)(i) PCT) and with the remaining features being included in a characterising part (Rule 6.3(b)(ii) PCT).

   The independent Claims should therefore be redrafted accordingly. If, however, the applicant is of the opinion that the two-part form would be inappropriate, then reasons therefor should be provided in the letter of reply. In addition, the applicant should ensure that it is clear from the description which features of the subject-matter of the independent Claims are **known from** document **D1** (see the PCT Guidelines PCT/GL/3 III, 2.3a).

2. Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents **D1 and D2** is not mentioned in the description, nor are these documents identified therein.

3. The description is should be in conformity with the claims as required by Rule 5.1(a)(iii) PCT. In particular the objective technical problem of the state of the art D1, solved by the characterizing part of the application, should be pointed out.

Re Item VIII

Certain observations on the international application

1. It is clear from the description on page 7, lines 25-30 that the following features (in bold letters) are **essential to the definition of the invention**:
   "... a conditional access subunit models the core functionality of a **descrambler.**"
   (1) **"receive scrambled streams"**,
   (2) **"descrambles them"**,
   (3) **"outputs a descrambled stream"**,

   and page 8, lines 2-6 shows that the definition of the subject matter "conditional access subunit" is too broad as "A solution exists in the form of ... However there exists a new requirement for a Networked Conditional Access Module (NCAM)." (see page 6, line 31- page 7, line 2):
   "The CA subunit contains the **descrambling** functionality ..."
   (4) "... required for an **NCAM** ..."

   The application consequently relates to a "Networked Conditional Access Module".

   Since independent Claims 1, 2, 3 and 28 do not contain these features it does not meet the requirement following from Article 6 PCT taken in combination with Rule 6.3(b) PCT that any independent claim must contain all the technical features essential to the definition of the invention.

2. The term "*subunit*" in **Claim 1** is not clear (Article 6 PCT) as the difference to a "unit" or "*Module*" (Claim 3) is **not defined by any feature.**

3. The category of the Claims 5-24 is not clear as it is generally not acceptable to have a mixture of categories in multiple dependent claims.

4. The designation of the subject matter "a subunit" (**Claim 2**) is not sufficiently clear (Article 6 PCT) to distinguish it from the "conditional access subunit" in Claim 1.

5. The designation of the subject matter "A method of providing a Conditional Access Module" (**Claim 3**) leaves doubt about the category of the claim (see PCT-Gazette, Section IV, III-4.1). Furthermore, Claim 3 does not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined. The claim attempts to define the subject-matter in terms of the result to be achieved which merely amounts to a statement of the underlying problem. The technical features necessary for achieving this result should be added.

6. **Claims 8 and 10** include features in brackets: "(purchase dialogue)", "(technical dialogue)", which does not allow to interpret these as part of the Claim, but to be only a support for analysing the figures.

7. In order to facilitate the examination of the conformity of the amended application with the requirements of Article 34(2)(b) PCT, the applicant is requested to clearly identify the amendments carried out, no matter whether they concern amendments by addition, replacement or deletion, and to indicate the passages of the application as filed on which these amendments are based (see also Rule 66.8(a) PCT).

   If the applicant regards it as appropriate these indications could be submitted in handwritten form on a copy of the relevant parts of the application as filed.

8. Any information the applicant may wish to submit concerning the subject-matter of the invention, for example further details of its advantages or of the problem it solves, and for which there is no basis in the application as filed, should be confined to the letter of reply rather than be incorporated into the application, Article 34(2)(b) PCT.

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Correspondence with the EPO on PCT Chapter II demands

In order to ensure that your PCT Chapter II demand is dealt with as promptly as possible you are requested to use the enclosed self-adhesive labels with any correspondence relating to the demand sent to the Munich Office.

One of these labels should be affixed to a prominent place in the upper part of the letter or form etc. which you are filing.

5

PATENT COOPERATION TREATY

PCT

REC'D 10 AUG 2000
WIPO
PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
N.74723A SLS		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/GB99/01392	05/05/1999	06/05/1998
International Patent Classification (IPC) or national classification and IPC H04L12/64		
Applicant SONY UNITED KINGDOM LIMITED et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 9 sheets, including this cover sheet.

   ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the report
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☒ Lack of unity of invention
   - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations suporting such statement
   - VI ☐ Certain documents cited
   - VII ☒ Certain defects in the international application
   - VIII ☒ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
18/11/1999	08.08.2000
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Huber, O Telephone No. +49 89 2399 8967

Form PCT/IPEA/409 (cover sheet) (January 1994)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB99/01392

I. Basis of the report

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

Description, pages:

1-27 as originally filed

Claims, No.:

1-28 as originally filed

Drawings, sheets:

1/15-15/15 as originally filed

2. The amendments have resulted in the cancellation of:

☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees the applicant has:

☐ restricted the claims.

☐ paid additional fees.

☐ paid additional fees under protest.

☒ neither restricted nor paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

   ☐ complied with.

   ☒ not complied with for the following reasons:

   see separate sheet

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

   ☐ all parts.

   ☒ the parts relating to claims Nos. 1-24, 28.

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	
	No:	Claims	1-24,28
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-24,28
Industrial applicability (IA)	Yes:	Claims	1-24,28
	No:	Claims	

2. Citations and explanations

   see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item IV
Lack of unity of invention

All independent claims must be linked by a single inventive concept (Rule 13.1 PCT). In the present case however, this requirement is not met. There are **three separate inventions** or groups of inventions, as follows:

I) A conditional access **subunit** (**Claim 1**) with corresponding **reciprocal subunit** (**Claim 2**), corresponding **method** defining a Conditional Access Module as a Conditional Access Subunit (**Claim 3**) and a corresponding **tuner** (**Claim 28**) comprising such a subunit, which comprises means to exchange AV/C Conditional Access Commands and replies over an IEEE 1394 network.

II) A conditional access **subunit** (**Claim 25**) which descrambles a transport stream, scrambles the stream again before retransmitting such that only authorized subunits can descramble the scream.

III) A conditional access **subunit** (**Claim 26**) which periodically contacts a tuner to request a transport stream for a period of time, which is long enough to update the entitlement management messages. Additionally a **network** (**Claim 27**) and a **tuner** (**Claim 28**) comprising such a subunit correspond thereto.

These **three** inventions **could be implemented independently** of each other and share neither an inventive concept (Rule 13.1 PCT), nor special technical features or method steps (Rule 13.2 PCT) for the following reason:

The inventions do not share any technical features beside the fact that they are used "for connection to an IEEE 1394 network" which is not a limiting feature ("for" is interpreted as "suitable for ...").

As the Applicant did **not respond to the invitation** to restrict the claims or pay additional fees, the preliminary examination **report is established on** those parts of the international application appearing to be the main invention, namely **invention I** (Article 34(3)(c) PCT).

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Reference is made to the following documents:

   D1 = I OKOTH ET AL: 'DVB: Common Interface als ideale interaktive Multimedia-Umgebung' FERNSEH UND KINOTECHNIK, vol. 51, no. 12, 1 January 1997 (1997-01-01), pages 854-856, XP002088534 ISSN: 0015-0142

   D2 = US-A-5 590 202 (BESTLER CAITLIN B ET AL) 31 December 1996 (1996-12-31)

2. As far as Claim 1 could be understood (see Item VIII), the subject-matter of **Claim 1** of the present application **cannot be considered as novel** (Article 33(2) PCT) for the following reason:

   Document **D1**, which is considered to represent the most relevant state of the art, **discloses** (according to the wording of present claim) **all features of Claim 1**, a conditional access (page 854, middle column, line 11: "*Conditional Access Module*") subunit (see Bild 3, the "Common Interface" separates the receiver from the descrambler; also Bild 4 shows the common interface) for connection to an IEEE 1394 network (page 856, 3. paragraph: "*Die Common-Interface-Spezifikation von DVB erlaubt den Anschluß von bis zu acht CI-Modulen ...*"), which comprises;
   means to receive AV/C Conditional Access Commands over the IEEE network from another subunit (page 854, right column, lines 5-8: "*Das Common Interface ist ein Bindeglied zwischen den nach DVB vereinheitlichten Komponenten ...*" and the standard comprises already the AV/C commands, see the description page 2, lines 9-14); and
   means to transmit AV/C responses over the IEEE 1394 network in response to the received AV/C Conditional Access Commands (the reply response scheme of the AV/C commands is part of the technical standard and as thus acknowledged in the description: page 26, lines 8-10: "*Due to the nature of AV/C commands whereby each command requires a response ...*").

Furthermore, it should be noted that even if novelty of Claim 1 could be argued, based on minor differences between the features of Claim 1 and those disclosed in D1, the subject-matter of Claim 1 would not involve an inventive step, Articles 33 (3) PCT, in view of the disclosure of D1, especially as this document discloses the same object and the same type of solution as claimed in Claim 1, i.e. a subunit connected via a common interface (IEEE 1394).

Present Claim 1 is therefore not considered as novel.

3. Independent **Claims 2,3 and 28 correspond for** the category "use", "method" and "tuner (system)" to the method claimed in **Claim 1**. Therefore the same objections arise regarding novelty as for Claim 1 (see paragraph 2.).

4. Dependent **Claims 4-24 do not contain** any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of **novelty**, the reasons being as follows:

The person skilled in the art is aware of the different commands to operate the Conditional Access Module, like the CA enable command (Claim 4) an op code like CC_{16} (Claim 5), a system ID (Claim 6), an action operand (Claim 7), an CA enable and notify command (Claim 9), a service ID (Claim 11), an operand for the number of PID definition to follow (Claim 12), a stream type operand (Claim 13), a CA entitlement command (Claim 14) with opcode CD_{16} (Claim 15) which includes a system ID (Claim 16) or defining broadcast systems (Claim 17), including various IDs (Claim 18), an operand able to represent entitlement status (Claim 19) with various values (Claim 20), a security command (Claim 21)with opcode $0F_{16}$ (Claim 22), the security command includes authentication (Claim 23), which are defined in the IEC61883 standard according to the description (page 2, lines 15-24).

These functions are also well known from document D2 which serve for the same purpose in a similar conditional access module.

Document **D1 further discloses**:

a. A descrambling facility within the subunit (**Claim 8 and 10**) is shown in 'Bild 3': "Descrambler" in CAM (Conditional Access Module).

b. The subunit only transmits data after authentication (**Claim 24**) is disclosed by the "Smart Card Interface" in 'Bild 3'.

Therefore the subject-matter of **Claims 2-24 is not considered as novel.**

As the Claims 1-24 and 28 are not considered as novel, the subject matter is also not inventive. Nevertheless the subject matter is industrially applicable.

Re Item VII

Certain defects in the international application

1. The independent Claims are not in the two-part form in accordance with Rule 6.3(b) PCT, which in the present case would be appropriate, with those features known in combination from the prior art document **D1**, being placed in a preamble (Rule 6.3(b)(i) PCT) and with the remaining features being included in a characterising part (Rule 6.3(b)(ii) PCT).

2. Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents **D1 and D2** is not mentioned in the description, nor are these documents identified therein.

3. The description is not in conformity with the claims as required by Rule 5.1(a)(iii) PCT. In particular the objective technical problem of the state of the art D1, solved by the characterizing part of the application, is not pointed out.

Re Item VIII

Certain observations on the international application

1. It is clear from the description on page 7, lines 25-30 that the following features (in bold letters) are **essential to the definition of the invention**:
   "... a conditional access subunit models the core functionality of a **descrambler.**"
   (1) **"receive scrambled streams"**,
   (2) **"descrambles them"**,
   (3) **"outputs a descrambled stream"**,

and page 8, lines 2-6 shows that the definition of the subject matter "conditional access subunit" is too broad as "A solution exists in the form of ... However there exists a new requirement for a Networked Conditional Access Module (NCAM)." (see page 6, line 31- page 7, line 2):
"The CA subunit contains the **descrambling** functionality ..."
(4) "... required for an **NCAM** ..."

The application consequently relates to a "Networked Conditional Access Module".

Since independent Claims 1, 2, 3 and 28 do not contain these features it does not meet the requirement following from Article 6 PCT taken in combination with Rule 6.3(b) PCT that any independent claim must contain all the technical features essential to the definition of the invention.

2. The term "*subunit*" in **Claim 1** is not clear (Article 6 PCT) as the difference to a "unit" or "*Module*" (Claim 3) is **not defined by any feature**.

3. The category of the Claims 5-24 is not clear as it is generally not acceptable to have a mixture of categories in multiple dependent claims.

4. The designation of the subject matter "a subunit" (**Claim 2**) is not sufficiently clear (Article 6 PCT) to distinguish it from the "conditional access subunit" in Claim 1.

5. The designation of the subject matter "A method of providing a Conditional Access Module" (**Claim 3**) leaves doubt about the category of the claim (see PCT-Gazette, Section IV, III-4.1). Furthermore, Claim 3 does not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined. The claim attempts to define the subject-matter in terms of the result to be achieved which merely amounts to a statement of the underlying problem. The technical features necessary for achieving this result should be added.

6. **Claims 8 and 10** include features in brackets: "(purchase dialogue)", "(technical dialogue)", which does not allow to interpret these as part of the Claim, but to be only a support for analysing the figures.

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

SMITH, Samuel L.
J.A. KEMP & CO.
14 South Square
Gray's Inn
London WC1R 5LX
GRANDE BRETAGNE

J. A. KEMP & Co
11 AUG 2000
Action by

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Rule 71.1)

Date of mailing *(day/month/year)*	08.08.2000
Applicant's or agent's file reference N.74723A SLS	**IMPORTANT NOTIFICATION**

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/GB99/01392	05/05/1999	06/05/1998

Applicant
SONY UNITED KINGDOM LIMITED et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.

2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.

3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/	Authorized officer
European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Ahrens, R Tel.+49 89 2399-8136

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
N.74723A SLS		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/GB99/01392	05/05/1999	06/05/1998
International Patent Classification (IPC) or national classification and IPC H04L12/64		
Applicant SONY UNITED KINGDOM LIMITED et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 9 sheets, including this cover sheet.

   ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

I	☒	Basis of the report
II	☐	Priority
III	☐	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
IV	☒	Lack of unity of invention
V	☒	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations suporting such statement
VI	☐	Certain documents cited
VII	☒	Certain defects in the international application
VIII	☒	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
18/11/1999	08.08.2000
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Huber, O Telephone No. +49 89 2399 8967

Form PCT/IPEA/409 (cover sheet) (January 1994)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB99/01392

I. Basis of the report

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

Description, pages:

1-27 as originally filed

Claims, No.:

1-28 as originally filed

Drawings, sheets:

1/15-15/15 as originally filed

2. The amendments have resulted in the cancellation of:

☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees the applicant has:

☐ restricted the claims.

☐ paid additional fees.

☐ paid additional fees under protest.

☒ neither restricted nor paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

   ☐ complied with.

   ☒ not complied with for the following reasons:

   see separate sheet

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

   ☐ all parts.

   ☒ the parts relating to claims Nos. 1-24, 28.

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	
	No:	Claims	1-24,28
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-24,28
Industrial applicability (IA)	Yes:	Claims	1-24,28
	No:	Claims	

2. Citations and explanations

see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item IV
Lack of unity of invention

All independent claims must be linked by a single inventive concept (Rule 13.1 PCT). In the present case however, this requirement is not met. There are **three separate inventions** or groups of inventions, as follows:

I) A conditional access **subunit** (**Claim 1**) with corresponding **reciprocal subunit** (**Claim 2**), corresponding **method** defining a Conditional Access Module as a Conditional Access Subunit (**Claim 3**) and a corresponding **tuner** (**Claim 28**) comprising such a subunit, which comprises means to exchange AV/C Conditional Access Commands and replies over an IEEE 1394 network.

II) A conditional access **subunit** (**Claim 25**) which descrambles a transport stream, scrambles the stream again before retransmitting such that only authorized subunits can descramble the scream.

III) A conditional access **subunit** (**Claim 26**) which periodically contacts a tuner to request a transport stream for a period of time, which is long enough to update the entitlement management messages. Additionally a **network** (**Claim 27**) and a **tuner** (**Claim 28**) comprising such a subunit correspond thereto.

These **three** inventions **could be implemented independently** of each other and share neither an inventive concept (Rule 13.1 PCT), nor special technical features or method steps (Rule 13.2 PCT) for the following reason:

The inventions do not share any technical features beside the fact that they are used "for connection to an IEEE 1394 network" which is not a limiting feature ("for" is interpreted as "suitable for ...").

As the Applicant did **not respond to the invitation** to restrict the claims or pay additional fees, the preliminary examination **report is established on** those parts of the international application appearing to be the main invention, namely **invention I** (Article 34(3)(c) PCT).

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Reference is made to the following documents:

   D1 = I OKOTH ET AL: 'DVB: Common Interface als ideale interaktive Multimedia-Umgebung' FERNSEH UND KINOTECHNIK, vol. 51, no. 12, 1 January 1997 (1997-01-01), pages 854-856, XP002088534 ISSN: 0015-0142

   D2 = US-A-5 590 202 (BESTLER CAITLIN B ET AL) 31 December 1996 (1996-12-31)

2. As far as Claim 1 could be understood (see Item VIII), the subject-matter of **Claim 1** of the present application **cannot be considered as novel** (Article 33(2) PCT) for the following reason:

   Document **D1**, which is considered to represent the most relevant state of the art, **discloses** (according to the wording of present claim) **all features of Claim 1**, a conditional access (page 854, middle column, line 11: "*Conditional Access Module*") subunit (see Bild 3, the "Common Interface" separates the receiver from the descrambler; also Bild 4 shows the common interface) for connection to an IEEE 1394 network (page 856, 3. paragraph: "*Die Common-Interface-Spezifikation von DVB erlaubt den Anschluß von bis zu acht CI-Modulen ...*"), which comprises;
   means to receive AV/C Conditional Access Commands over the IEEE network from another subunit (page 854, right column, lines 5-8: "*Das Common Interface ist ein Bindeglied zwischen den nach DVB vereinheitlichten Komponenten ...*" and the standard comprises already the AV/C commands, see the description page 2, lines 9-14); and
   means to transmit AV/C responses over the IEEE 1394 network in response to the received AV/C Conditional Access Commands (the reply response scheme of the AV/C commands is part of the technical standard and as thus acknowledged in the description: page 26, lines 8-10: "*Due to the nature of AV/C commands whereby each command requires a response ...*").

Furthermore, it should be noted that even if novelty of Claim 1 could be argued, based on minor differences between the features of Claim 1 and those disclosed in D1, the subject-matter of Claim 1 would not involve an inventive step, Articles 33 (3) PCT, in view of the disclosure of D1, especially as this document discloses the same object and the same type of solution as claimed in Claim 1, i.e. a subunit connected via a common interface (IEEE 1394).

Present Claim 1 is therefore not considered as novel.

3. Independent **Claims 2,3 and 28 correspond for** the category "use", "method" and "tuner (system)" to the method claimed in **Claim 1**. Therefore the same objections arise regarding novelty as for Claim 1 (see paragraph 2.).

4. Dependent **Claims 4-24 do not contain** any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of **novelty**, the reasons being as follows:

The person skilled in the art is aware of the different commands to operate the Conditional Access Module, like the CA enable command (Claim 4) an op code like CC_{16} (Claim 5), a system ID (Claim 6), an action operand (Claim 7), an CA enable and notify command (Claim 9), a service ID (Claim 11), an operand for the number of PID definition to follow (Claim 12), a stream type operand (Claim 13), a CA entitlement command (Claim 14) with opcode CD_{16} (Claim 15) which includes a system ID (Claim 16) or defining broadcast systems (Claim 17), including various IDs (Claim 18), an operand able to represent entitlement status (Claim 19) with various values (Claim 20), a security command (Claim 21)with opcode $0F_{16}$ (Claim 22), the security command includes authentication (Claim 23), which are defined in the IEC61883 standard according to the description (page 2, lines 15-24).

These functions are also well known from document D2 which serve for the same purpose in a similar conditional access module.

Document **D1 further discloses**:

a. A descrambling facility within the subunit (**Claim 8 and 10**) is shown in 'Bild 3': "Descrambler" in CAM (Conditional Access Module).

b. The subunit only transmits data after authentication (**Claim 24**) is disclosed by the "Smart Card Interface" in 'Bild 3'.

Therefore the subject-matter of **Claims 2-24 is not considered as novel.**

As the Claims 1-24 and 28 are not considered as novel, the subject matter is also not inventive. Nevertheless the subject matter is industrially applicable.

Re Item VII
Certain defects in the international application

1. The independent Claims are not in the two-part form in accordance with Rule 6.3(b) PCT, which in the present case would be appropriate, with those features known in combination from the prior art document **D1**, being placed in a preamble (Rule 6.3(b)(i) PCT) and with the remaining features being included in a characterising part (Rule 6.3(b)(ii) PCT).

2. Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents **D1 and D2** is not mentioned in the description, nor are these documents identified therein.

3. The description is not in conformity with the claims as required by Rule 5.1(a)(iii) PCT. In particular the objective technical problem of the state of the art D1, solved by the characterizing part of the application, is not pointed out.

Re Item VIII
Certain observations on the international application

1. It is clear from the description on page 7, lines 25-30 that the following features (in bold letters) are **essential to the definition of the invention:**
"... a conditional access subunit models the core functionality of a **descrambler."**
(1) **"receive scrambled streams",**
(2) **"descrambles them",**
(3) **"outputs a descrambled stream",**

and page 8, lines 2-6 shows that the definition of the subject matter "conditional access subunit" is too broad as "A solution exists in the form of ... However there exists a new requirement for a Networked Conditional Access Module (NCAM)." (see page 6, line 31- page 7, line 2):
"The CA subunit contains the **descrambling** functionality ..."
(4) "... required for an **NCAM** ..."

The application consequently relates to a "Networked Conditional Access Module".

Since independent Claims 1, 2, 3 and 28 do not contain these features it does not meet the requirement following from Article 6 PCT taken in combination with Rule 6.3(b) PCT that any independent claim must contain all the technical features essential to the definition of the invention.

2. The term "*subunit*" in **Claim 1** is not clear (Article 6 PCT) as the difference to a "unit" or "*Module*" (Claim 3) is **not defined by any feature**.

3. The category of the Claims 5-24 is not clear as it is generally not acceptable to have a mixture of categories in multiple dependent claims.

4. The designation of the subject matter "a subunit" (**Claim 2**) is not sufficiently clear (Article 6 PCT) to distinguish it from the "conditional access subunit" in Claim 1.

5. The designation of the subject matter "A method of providing a Conditional Access Module" (**Claim 3**) leaves doubt about the category of the claim (see PCT-Gazette, Section IV, III-4.1). Furthermore, Claim 3 does not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined. The claim attempts to define the subject-matter in terms of the result to be achieved which merely amounts to a statement of the underlying problem. The technical features necessary for achieving this result should be added.

6. **Claims 8 and 10** include features in brackets: "(purchase dialogue)", "(technical dialogue)", which does not allow to interpret these as part of the Claim, but to be only a support for analysing the figures.